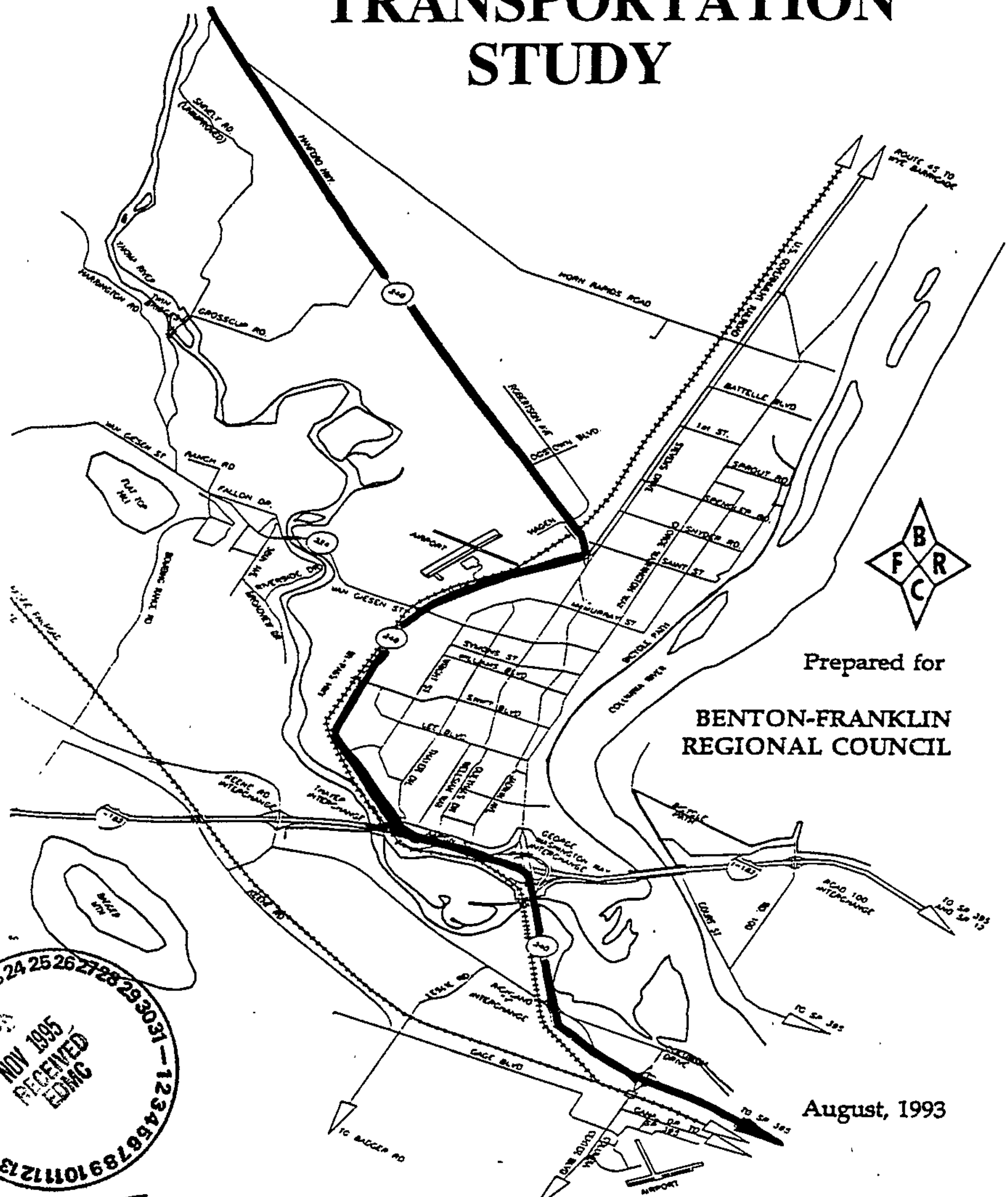
SR 240 CORRIDOR TRANSPORTATION STUDY



Prepared for

BENTON-FRANKLIN
REGIONAL COUNCIL

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J-U-B

BUCHER, WILLIS & RATLIFF
ENGINEERS • PLANNERS • ARCHITECTS

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EXECUTIVE SUMMARY

State Route 240 is the Tri-Cities busiest traffic corridor. In the past few years a steady increase of traffic has been experienced along the corridor. The recent increases in traffic volume have resulted in operational problems on the SR 240 Bypass. Other roadways and intersections within the corridor have experienced deteriorating operations as well. Because of this, the SR 240 Transportation Study was conducted in order to evaluate current and future transportation demands and to provide recommendations for future roadway corridors to assure a coordinated roadway plan for the entire area.

This study was prepared for the Benton-Franklin Regional Council by the consulting firms of Bucher, Willis & Ratliff and J-U-B Engineers. A Project Steering Committee and a Policy Steering Committee were formed comprised of staff from the BFRC, Benton County, Washington Department of Transportation, Department of Energy, Westinghouse Hanford, Ben Franklin Transit, and the cities of Richland, West Richland, and Kennewick.

The study presented in this report is segregated into four major sections. These sections are as follows:

- Section 1: Existing Traffic Conditions;
- Section 2: Analysis of Future Conditions;
- Section 3: Implementation Costs & Funding; and
- Section 4: Evaluation and Recommendations.

Each section is summarized below. Additional information can be found in the report.

SECTION 1: EXISTING TRAFFIC CONDITIONS

The primary objective of this section of the report was to assess existing traffic conditions in the study area. In order to identify existing traffic capacity and traffic safety problems, a comprehensive data collection process was undertaken.

The following categories of information are included in this chapter:

- Study Area Definition;
- Street Functional Classification;
- Lane Configuration;
- Daily Traffic Volumes;
- Traffic Control;
- Origin - Destination Traffic from Hanford;
- Vehicle Occupancy Rates;
- Transit Commuter Routes;
- Pedestrian/Bicycle/Equestrian Routes;
- Intersection Operation; and
- Traffic Study.

The assessment of existing traffic conditions served to document existing traffic levels, accident locations, and traffic capacity problems. Traffic capacity problems were defined by the Steering Committee to include all intersections and street segments which exceed a Level-Of-Service C, as defined in the 1985 Highway Capacity Manual. The areas found to meet this criteria for capacity problems were;

- SR 240 Hanford Highway/SR 240 Bypass Highway Intersection;
- SR 240 Bypass Highway/Van Giesen Street Intersection;
- SR 240 Bypass Highway/I-182 Interchange;
- George Washington Way/Spengler Road Intersection;
- George Washington Way/Swift Boulevard Intersection;
- George Washington Way/Lee Boulevard Intersection;

- Jadwin Avenue/Lee Boulevard Intersection;
- Columbia Center Boulevard/SR 240 South Ramp Intersection;
- SR 240 Bypass Highway/Duportail Road Intersection;
- Lee Boulevard/Wellsian Way Intersection;
- Van Giesen Street/Thayer Drive;
- Stevens Drive/Snyder Road Intersection;
- Stevens Drive/Saint Street Intersection;
- Stevens Drive/Horn Rapids Road Intersection;
- SR 240 I-182 to Richland Wye
- SR 240 Richland Wye to Columbia Center Boulevard
- Stevens Drive Horn Rapids Road to SR 240
- I-182/George Washington Way Interchange

One finding of this section which attracted publicity in the local newspaper was the vehicle occupancy rates. The results of the vehicle occupancy survey indicated a very high percentage of single-occupant vehicles throughout the corridor of 87%. For the SR 240 Bypass Highway this figure was determined to be 90%.

An origin-destination survey was also conducted to track vehicles leaving the Hanford Area during the p.m. peak period. The analysis of the survey results revealed that approximately 2% of the vehicles stopped somewhere within the Richland Business district for a period of time greater than 15 minutes. It was concluded that the majority of p.m. peak commuters were homeward bound with minimal shopping stops or diversions.

SECTION 2: ANALYSIS OF FUTURE CONDITIONS

The objective of this section was to define transportation mobility problems within the SR 240 Corridor which are likely to exist in the future. Past growth trends as well as future growth potential were described. This section provided a systematic analysis of potential transportation mobility solutions to existing and future corridor congestion problems. To do so, a traffic simulation model was developed to represent traffic flows in the study area. Base roadway, land use and development data were obtained from field studies or from information provided by the local agencies.

The modeling process involved four major steps:

- Constructing a computerized street system;
- Developing a land use database;
- Testing the model until existing traffic flows were represented; and
- Using the model to test alternatives.

A wide range of potential transportation solutions were investigated as part of this section. Solutions or approaches that were developed by the Steering Committee included the following:

- Scenario 1 - No Build: Allow traffic to increase without making any improvements to the street system;
- Scenario 2 - TIP Projects: Future year traffic increases with roadway improvements identified in the region's Transportation Improvement Program;
- Scenario 3 - Reconstruct SR 240/Stevens Drive to a freeway facility by implementing new interchanges and controlling access;
- Scenario 4 - Widen SR 240/Stevens Drive to six lanes with signal modifications;
- Scenario 5 - Construct a new Bypass Route through West Richland;

- Scenario 6 - Construct the Horn Rapids Toll Bridge and extend Horn Rapids Road from Stevens Drive to US 395 with connection to Road 68; and

- Scenario 7 - Modify commute trip behavior by implementing a transportation demand management program.

In addition to these potential solutions developed by the Steering Committee, several comments and suggestions were received from the public during the two public meetings held during the course of the study. In general, the public emphasized their desire to divert traffic away from the residential areas. Interest was also expressed to improve non-motorized facilities and to reduce travel demand. Mixed reaction was received on the proposed physical improvements. A list of public comments are contained in Section 2 of the report. Additional correspondence is included in Appendix C.

SECTION 3: IMPLEMENTATION COSTS & FUNDING

The objective of this section was to provide the estimated costs for each scenario and to provide potential sources of funding. The preliminary estimate of probable costs for the various improvements tested in the seven scenarios are as follows:

ESTIMATED IMPROVEMENT COSTS

Scenario/Project	Estimated Cost
#3 Horn Rapids Interchange	$2,400,000
#3 1st Street Interchange	$2,600,000
#3 Stevens/Jadwin/Bypass Interchange	$3,500,000
#3 Van Giesen Interchange	$7,300,000
#3 Duportail Interchange	$2,600,000
#3 Frontage Road - Horn Rapids to Saint	$3,600,000
#4 Widen Stevens Drive. SR 240 Bypass. SR 240	$19,200,000
#5 West Richland Route (2 lane facility)	$8,800,000
#6 Horn Rapids Bridge & Extension from Stevens Drive to US 395 (7.6 miles)	$51,500,000
#3,5,6 Widen SR 240 (I-182 to Columbia Center Blvd.)	$10,000,000
#7 Transportation Demand Management	See Report

The Transportation Demand Management alternative reviewed in this study assumed that the implementation of an aggressive TDM program would be the responsibility of major employers in the study area. Most of the TDM components would result in the investment of private funds. For the purposes of this report, it is assumed that minimal, if any, public funding would be required to implement a TDM program. However, it is not prudent to assume that some public improvements would not be needed to assure the success of the TDM program such as new buses, additional bus stops, park and ride facilities, and perhaps the administration of monitoring the various programs.

SECTION 4: EVALUATION AND RECOMMENDATION

The objective of this section was to provide an evaluation matrix to rate each improvement alternative. Evaluation of the various improvements serves three purposes in the transportation planning process. First, it determines the value of the individual scenarios and the desirability of one over another. Second, evaluation provides information to decision makers on the impacts of the project and program proposals, their trade-offs, and the major areas of uncertainty. Finally, evaluation provides planners and engineers with an opportunity to identify further areas of study.

The strengths and weaknesses of each alternative were evaluated based on the following categories:

- Safety — Measures the ability of the alternative to improve overall safety.
- Congestion Relief — Assesses the ability of the improvement to reduce congestion.
- Impacts on Environment — Assesses the potential for environmental impacts based on similar projects.

- Community Support — Based on response at public meetings, correspondence, and discussions.
- Cost — Identifies economic feasibility of the alternative.
- Vehicle Miles Travel — Assesses the ability of each alternative to reduce vehicle miles of travel throughout the corridor. Typically, reduction of VMT also produces the benefit of reducing auto emissions.

Based on the evaluation matrix, the best alternative which addresses the combined categories is Transportation Demand Management. However, TDM ranks the worst in terms of its ability to reduce congestion within the corridor. The alternative which would complement TDM by improving most of the traffic deficiencies is contained in Scenario 3. In this scenario, congestion is relieved at the SR 240/SR 240 Bypass/Jadwin intersection as well as at Van Giesen and Duportail. This scenario also has the potential to have good community support. Another alternative which provides congestion relief with good community support is the West Richland Route contained in Scenario 5. The alternative which produced the best ability to reduce congestion along the corridor was widening SR 240, SR 240 Bypass, and Steven Drive to six lanes.

These recommendations and their respective time tables are identified in the following table.

RECOMMENDATIONS

Project	Suggested Time Table (years)
Implementation of Aggressive Transportation Demand Management Program	1 to 5
New Interchanges, Access Controls to Develop Freeway Facility	2 to 6
Widen SR 240 (I-182 to Columbia Center Boulevard)	5 to 15
West Richland Route	5 to 15
Widen SR 240, Stevens Drive, and SR 240 Bypass to six lanes	15 to 20

SECTION 1

INTRODUCTION

State Route 240 is the Tri-Cities busiest traffic corridor. In the past few years a steady increase of traffic has been experienced along the corridor. Much of this increase can be attributed to recent employment surges along the corridor including the Hanford Reservation project which has contributed significantly to this employment surge. Growth is expected to continue, as the overall long-term mission at the federally owned reservation has changed in focus. New and existing work forces are expected to grow to support clean-up and service industries.

The recent increases in traffic volume have resulted in operational problems on the SR 240 by-pass. Other roadways and intersections within the corridor have experienced deteriorating operations as well. Because of this, the SR 240 Transportation Study is being conducted in order to evaluate current and future transportation demands and to provide recommendations for future roadway corridors to assure a coordinated roadway plan for the entire area.

This study was prepared for the Benton-Franklin Regional Council by the consulting firms of Bucher, Willis & Ratliff and J-U-B Engineers. A Project Steering Committee and a Policy Steering Committee were formed comprised of staff from the BFRC, Benton County, Washington Department of Transportation, Department of Energy, Westinghouse Hanford, Ben Franklin Transit, and the cities of Richland, West Richland, and Kennewick.

EXISTING TRAFFIC CONDITIONS

The primary objective of this section of the report is to assess existing traffic conditions in the Richland Metropolitan area. In order to identify existing traffic capacity and traffic safety problems, a comprehensive data collection process was undertaken.

The following categories of information are included in this chapter:

- Study Area Definition;
- Street Functional Classification;

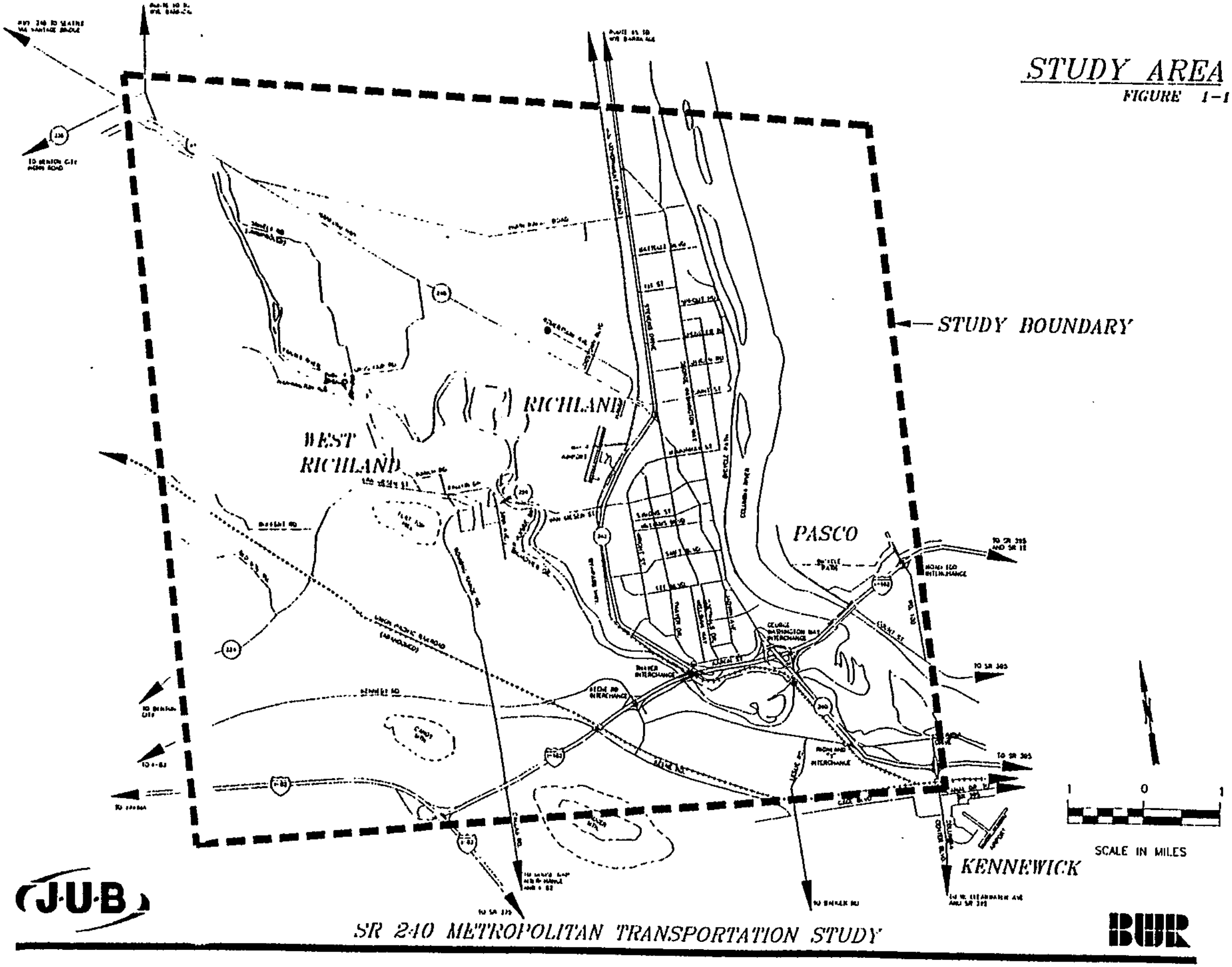
- Lane Configuration;
- Daily Traffic Volumes;
- Traffic Control;
- Origin - Destination Traffic from Hanford;
- Vehicle Occupancy Rates;
- Transit Commuter Routes;
- Pedestrian/Bicycle/Equestrian Routes.
- Intersection Operation; and
- Traffic Safety

Study Area

The study area is generally defined as the area located west of the Columbia River, north of I-82, Badger Mountain and Gage Boulevard, east and south of the Route 10/SR 240 Highway intersection. A majority of the study area is in the City of Richland. The western portion of the study area is under the jurisdiction of Benton County. The Columbia Center Boulevard Interchange with SR 240 is included and is under the jurisdiction of the City of Kennewick. The study area is shown in Figure 1-1. The eastern portion of the study area is already developed. SR 240. Stevens Drive and George Washington Way are heavily travelled corridors which accommodate through traffic for commuters to and from Hanford. This study will include review of the SR 240 Corridor and the George Washington Way Corridor.

Existing Street Functional Classification

The existing street functional classification is shown in Figure 1-2. Streets have been classified based upon guidelines prepared by the Federal Highway Administration (FHWA).


STUDY AREA
FIGURE 1-1
STUDY BOUNDARY
RICHLAND
WEST RICHLAND
PASCO
KENNEWICK
SCALE IN MILES
1
0
1
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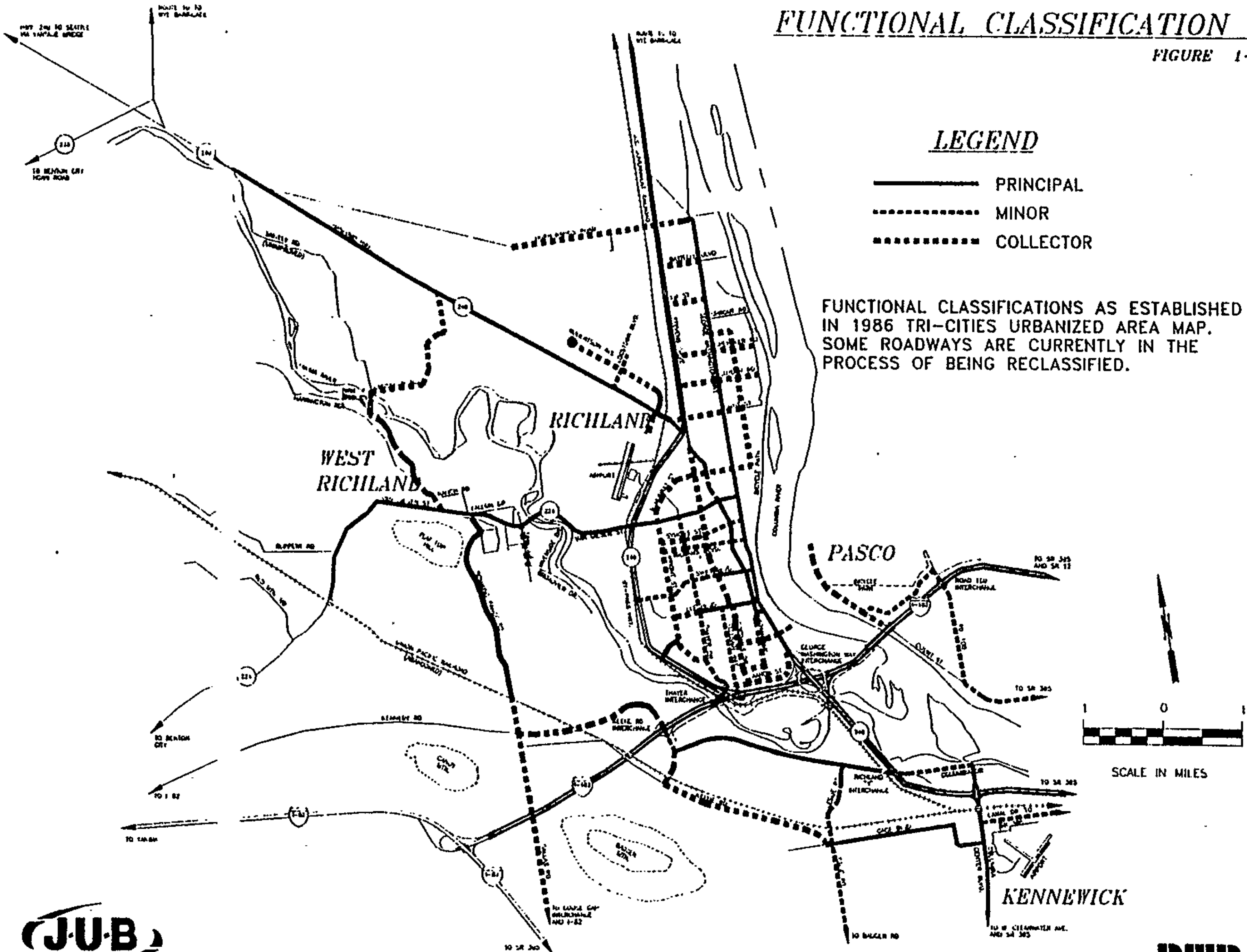
FUNCTIONAL CLASSIFICATION MAP

FIGURE 1–2



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- Principal Arterial - streets and highways contain the greatest proportion of through or long-distance travel. Such facilities serve the high-volume travel corridors that connect the major generators of traffic. The selected routes provide an integrated system for complete circulation of traffic, including ties to the major rural highways entering the urban area. Generally, major arterials include all high traffic volume streets.

- Minor Arterial - streets and highways connect with all remaining arterial and collector roads that extend into the urban area. Minor arterial streets and highways serve less concentrated traffic-generating areas such as neighborhood shopping centers and schools. Minor arterial streets serve as boundaries to neighborhoods and collect traffic from collector streets. Although the predominant function of minor arterial streets is the movement of through traffic, they also provide for considerable local traffic that originates or is destined to points along the corridor.

- Collector - streets provide direct services to residential areas, local parks, churches, etc. To preserve the amenities of neighborhoods, they are usually spaced at about half-mile intervals to collect traffic from local-access streets and convey it to major and minor arterial streets and highways. Collector streets are typically one to two miles in length. Direct access to abutting land is essential.

- Local-access - streets are those not selected for inclusion in the arterial or collector classes. They allow access to individual homes, shops, and similar traffic destinations. Direct access to abutting land is essential, for all traffic originates from or is designated to abutting land. Through traffic should be discouraged by using appropriate geometric designs and traffic control devices.

The major streets in the SR 240 Metropolitan area have a grid-system orientation, with many of the arterials located on mile section lines. Exceptions to this system occur when paralleling natural features such as the Columbia River.

Principal arterials include the freeway facilities, George Washington Way, Stevens Drive, Jadwin Avenue, and Van Giesen Street. Minor arterials include Swift Boulevard, Columbia Drive, Leslie Road, and Thayer Drive. Collector routes include McMurray Street, Goethals Drive, Spengler Road, Snyder Road and Saint Street.

Lane Configuration

The widths of major streets in the SR 240 Metropolitan Area are shown in Figure 1-3. Streets with four or five lanes correspond to a large extent with the arterials shown on the functional classification map. SR 240 and George Washington Way have four or five lanes. Other streets have two lanes. I-182 has four through lanes within the metropolitan area.

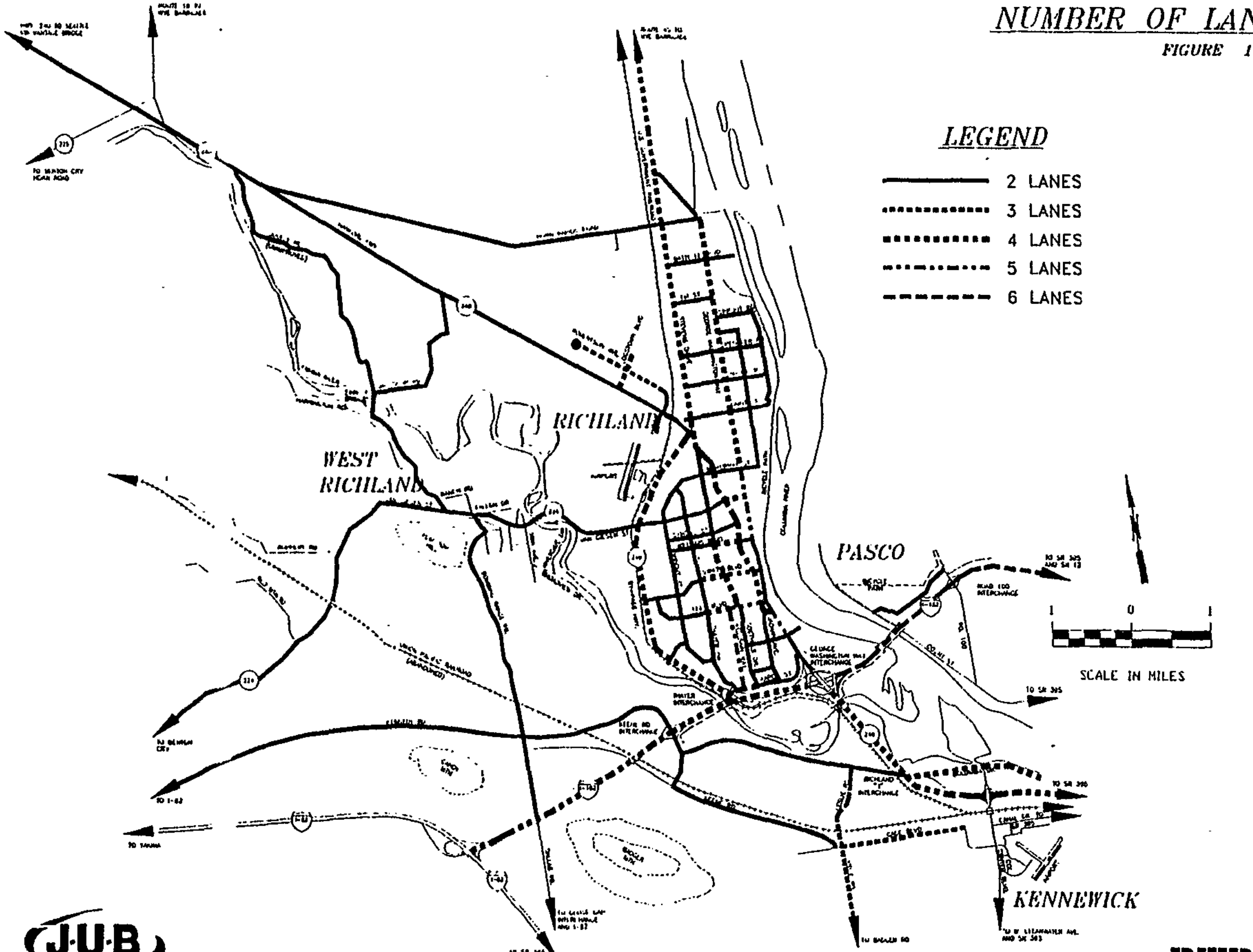
Average Daily Traffic (1992 Basis)

The average daily traffic (ADT) volumes are shown on Figures 1-4A and 1-4B. The traffic counts were obtained from the Benton-Franklin Regional Council, the Washington Department of Transportation (WSDOT), local governments and field counters. Nearly all of the counts were taken in 1991 and 1992 with supplemented counts in 1993. Traffic volumes for years other than 1992 were factored by the regionally approved three percent annual growth rate to obtain consistent 1992 traffic count information.

High traffic volumes occur on George Washington Way and Stevens Drive, where traffic volumes exceed 25,000 vehicles per day. SR 240 Bypass currently carries about 22,000 vehicles per day. The ADT on SR 240 between Richland and Kennewick was approximately 36,000. Traffic volumes in the western half of the study area were all under 7,000 ADT. The highest traffic volumes in the western portion of the study area were on Van Giesen Street, and Keene Road.

NUMBER OF LANES

FIGURE 1-3



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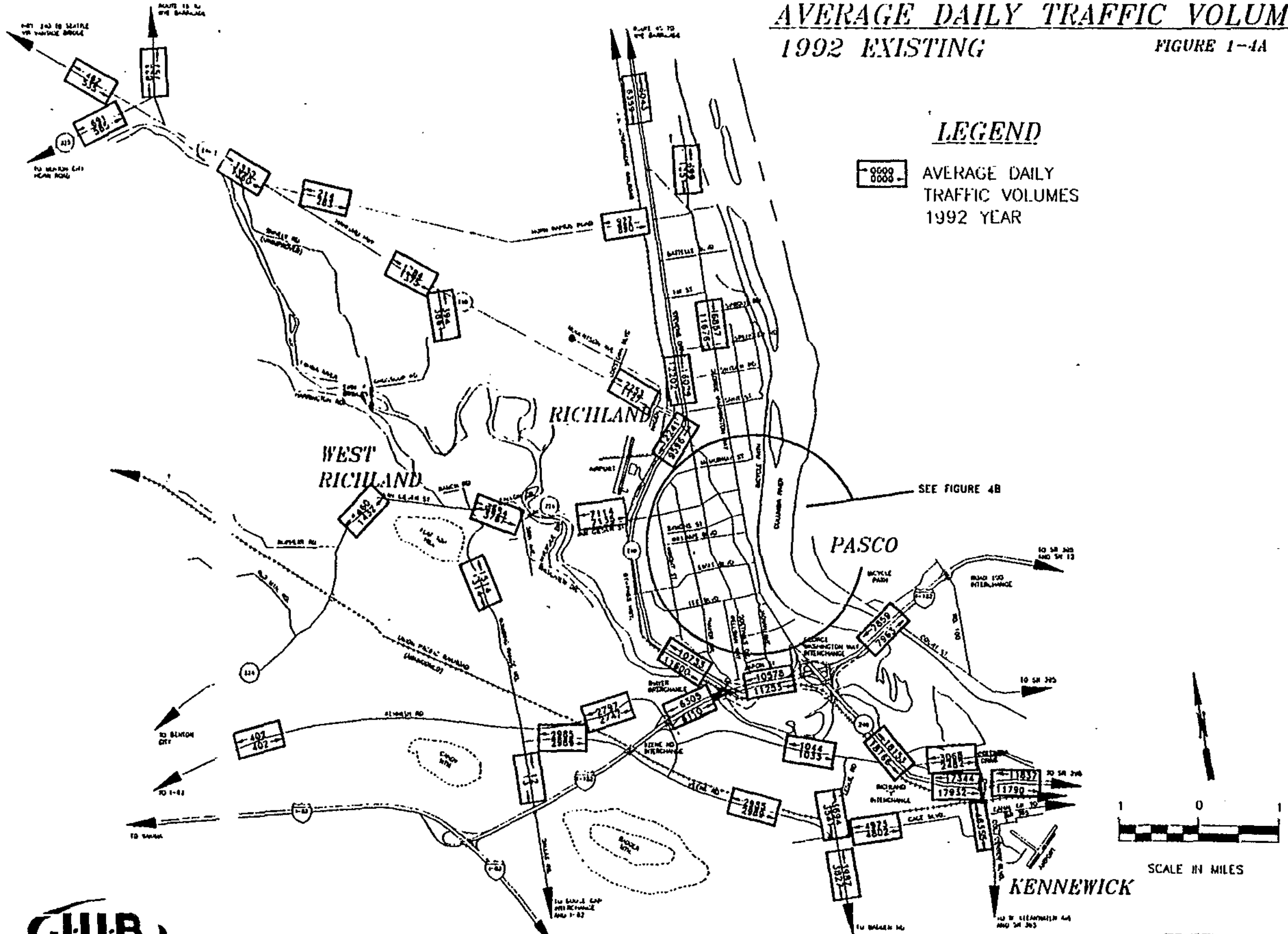
AVERAGE DAILY TRAFFIC VOLUMES
1992 EXISTING

FIGURE 1-4A



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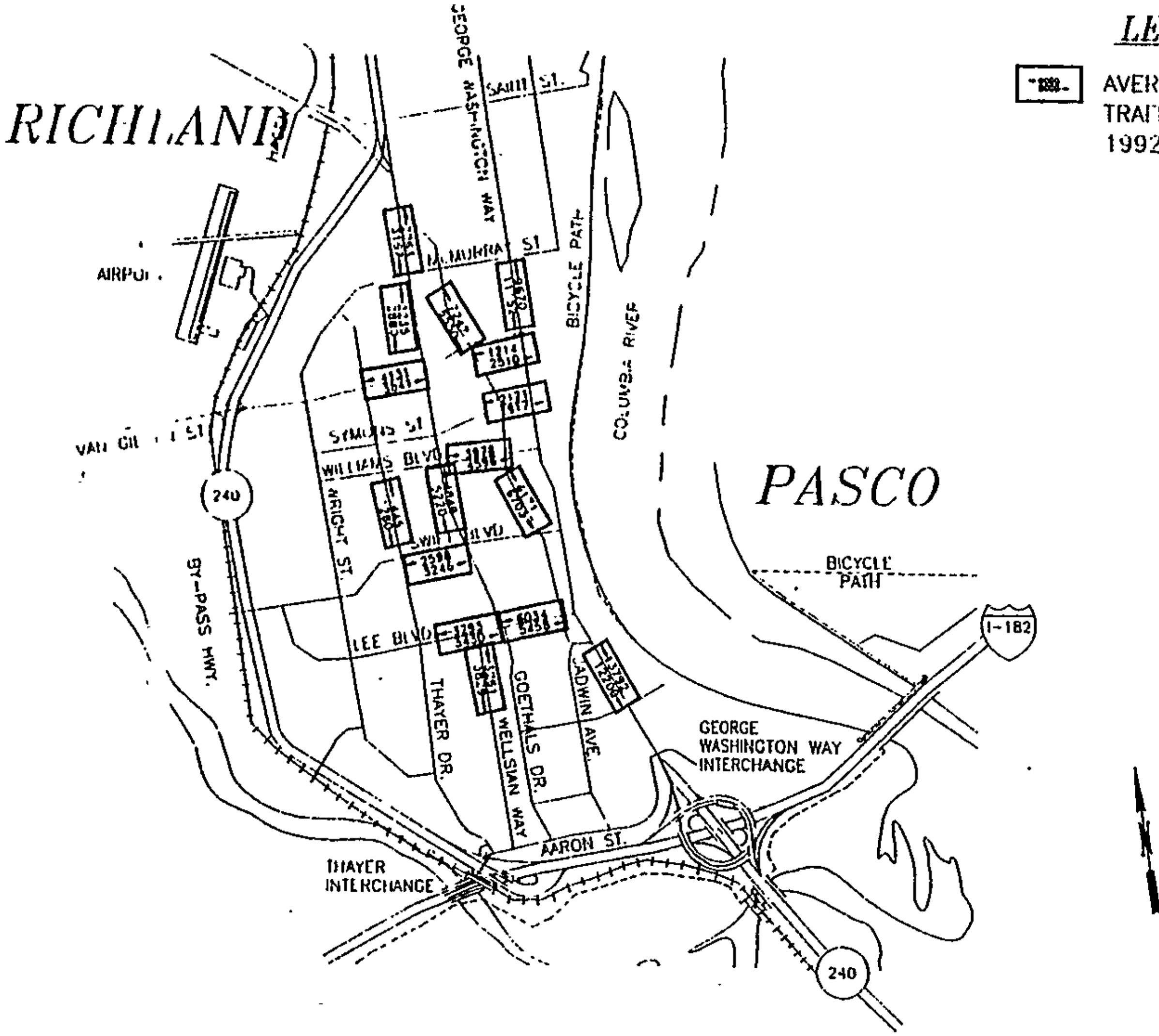
AVERAGE DAILY TRAFFIC VOLUMES
RICHLAND SUBAREA
1992 EXISTING

FIGURE 1-4B

LEGEND

AVERAGE DAILY TRAFFIC VOLUMES 1992 YEAR



Traffic Control Devices

Traffic signals are currently in operation at a number of major intersections in the study area. The signals are primarily located in the Richland portion of the study area due to higher traffic volumes at these locations. The traffic signal locations and functional operation are identified in Figure 1-5. The City of Richland has recently completed a traffic signal upgrade study and has identified the following improvements to signalized intersections:

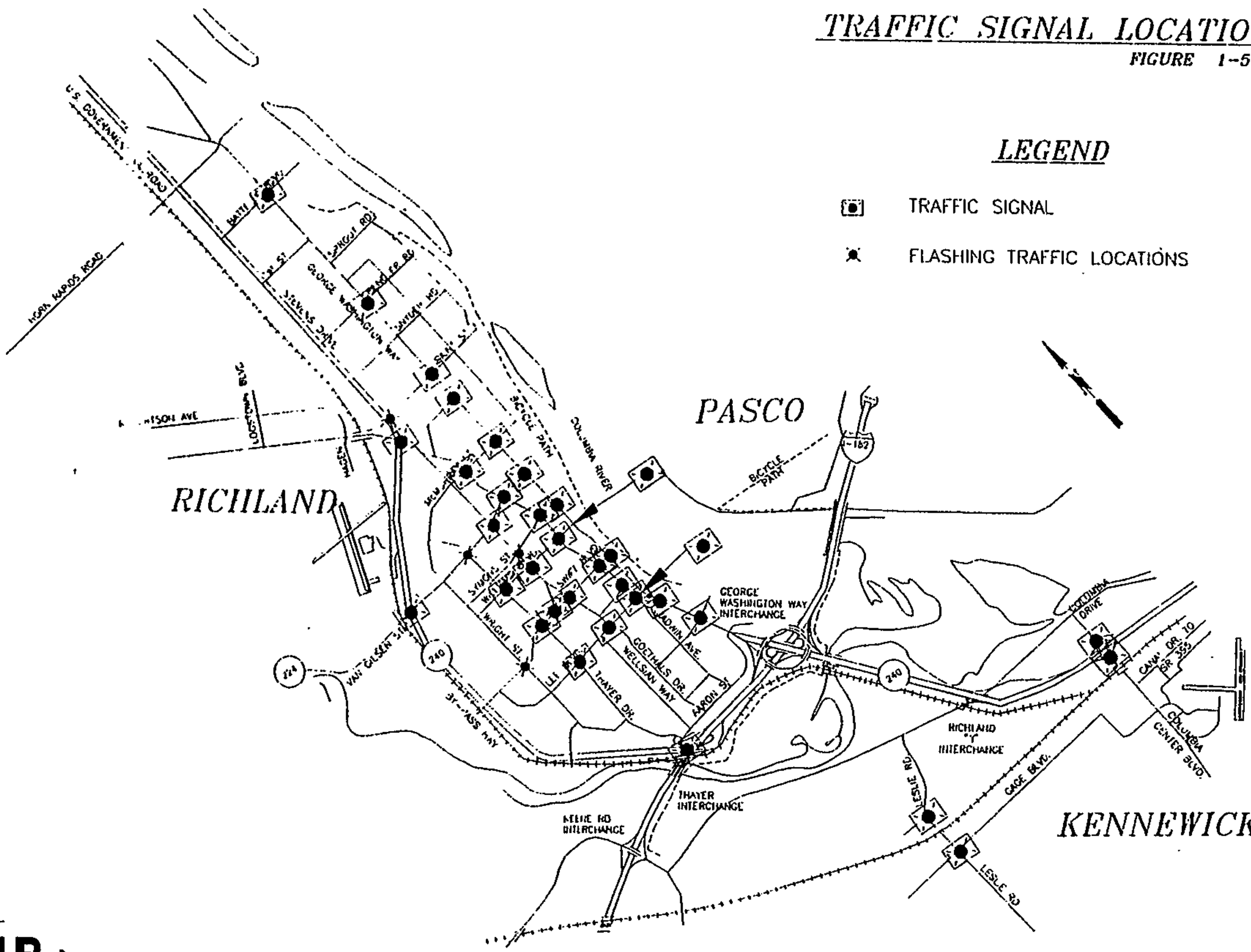
Signal Location	Improvements
George Washington Way & Jadwin	Upgrade equipment
George Washington Way & Lee	Upgrade equipment
George Washington Way & Williams	Upgrade equipment
George Washington Way & Symons	Upgrade equipment
George Washington Way & Van Giesen	Upgrade equipment
George Washington Way & McMurray	Upgrade equipment
George Washington Way & Catskill	Upgrade equipment
George Washington Way & Saint	Upgrade equipment
George Washington Way & Spengler	Upgrade equipment
George Washington Way & Battelle	Upgrade equipment
Jadwin & Lee	Upgrade equipment
Jadwin & Knight	Upgrade equipment
Jadwin & Swift	Upgrade equipment
Jadwin & Williams	Upgrade equipment
Jadwin & Symons	Upgrade equipment
Jadwin & Van Giesen	Upgrade equipment
Jadwin & McMurray	Upgrade equipment
Stevens & Lee	Upgrade equipment
Stevens & Swift	Upgrade equipment
Stevens & Williams	Upgrade equipment
Stevens & Van Giesen	Upgrade equipment
Thayer & Swift	Upgrade equipment
Thayer & Williams	Modify to Flashing Beacon
Long & Swift	Upgrade equipment

TRAFFIC SIGNAL LOCATIONS

FIGURE 1-5

LEGEND

- TRAFFIC SIGNAL
- FLASHING TRAFFIC LOCATIONS



Origin-Destination Analysis

A license plate survey was conducted to identify the destination of traffic leaving Hanford during the P.M. peaks. The period from 3:00 P.M. to 5:00 P.M. was selected as the appropriate period for characterizing commuter traffic routes. Both Stevens Drive and George Washington Way between Snyder Road and Saint Street were the origin station field collection points. License plates were logged as the traffic passed these stations heading southbound. Various destination stations were established along the typical commuter routes through Richland including: Van Giesen Street, Thayer Drive Interchange, George Washington Way Interchange and downtown along Jadwin Avenue, Stevens Drive, and George Washington Way.

Both an initial and supplemental license plate survey were conducted in April. After detailed review and analysis of information gained from the surveys, it was concluded that both surveys were limited in their results due to the volume and speed of traffic.

Overall distribution of the origin point traffic was identified by comparing observations at the I-182 connections with SR 240 bypass and George Washington Way. The results of this comparison were checked against Hanford Employment home location figures to establish their validity. Table 1-1 reflects the traffic distribution percentages compared to the worker home locations. This information can be utilized in evaluating the computer traffic simulation results.

TABLE 1-1
EMPLOYEE HOME LOCATION
HANFORD WORKERS

HOME BASE	NO. EMPLOYEES	PERCENT	SURVEY RESULTS
Benton City/Yakima/Western Region	1,743	11%	10%
Pasco/Walla Walla/Northern Region	1,549	9%	9%
West Richland	965	6%	4%
Richland	7,147	44%	54%
Kennewick/Finley/Southern & Eastern Region	4,960	30%	23%
TOTAL	16,364	100%	100%

Typically, license plate surveys do not produce information on trip purpose but the time between observations of a vehicle can indicate fairly accurately whether stops were made in the business district. During this license plate survey, the time of passage was recorded as vehicles left the origin observation point and again when they entered the various destination observation points. Of the sample taken, the data indicated that approximately 2% of the vehicles stopped for a period of time greater than 15 minutes yet less than 30 minutes. This would indicate that during the P.M. peak, the majority of commuters from the Hanford Area who live outside of Richland are more interested in a homeward bound trip.

Vehicle Occupancy Survey

To better understand the characteristics of commuters to and from Hanford, a vehicle occupancy survey was conducted. Field personnel were stationed to capture both the morning and evening peak periods. The observation stations included Stevens Drive, north of Snyder Road; George Washington Way, south of Saint Street for P.M. traffic; and SR 240, west of Columbia Center Boulevard for A.M. traffic. The goal of the field observations was to gather a representative sample of the number of single and multiple occupancy vehicles commuting to and from Hanford.

Results of the vehicle occupancy survey are summarized in Table 1-2. The data identifies the total number of vehicles observed during each period and their number of occupants per vehicle. The results indicate a very low percentage of multiple occupancy usage (13%). This information will be used in later report analysis to determine the opportunity for increasing ride sharing activities.

TABLE 1-2
VEHICLE OCCUPANCY RESULTS
HANFORD COMMUTER TRAFFIC

Location	Period	Total Vehicle Count	NUMBER OF OCCUPANTS PER VEHICLE 1		2		3		4 or More	
SR 240	7:00 - 9:00 a.m.	2927	2628	89.78%	258	8.81%	9	0.65%	22	0.75%
Stevens Drive	3:00 - 5:00 p.m.	4126	3584	86.86%	463	11.22%	53	1.28%	26	0.63%
George Wash. Way	3:00 - 5:00 p.m.	2733	2317	84.78%	361	13.21%	22	0.80%	33	1.21%
			87%		11%		1%		1%	

Transit Commuter Routes

Ben Franklin Transit (BFTA) serves the Tri-Cities area with local bus services. There are five transit centers within the Tri-Cities: one in Richland on Knight Street; three in Kennewick on Huntington Street, Dayton Street and 10th Avenue, and the Columbia Center Transfer Point; and one in Pasco on 22nd Avenue. Figure 1-6 identifies the main commuter transit routes which traverse the entire metropolitan study area.

Route 120 is a main transit route linking all three cities together, as well as West Richland. It stops at all the transit centers with the exception of Dayton and 10th Street in Kennewick. Route 120 leaves the Columbia Center Transfer Point in Kennewick every 30 minutes and enters Richland via SR 240 to the Knight Street Transfer Center.

In addition, Ben Franklin Transit has several commuter routes which originate for the most part at the 22nd Street Transit Center in Pasco, travel to the Huntington Transit Center in Kennewick and enter Richland via SR 240. These routes serve the Hanford area directly and operate in the A.M. and P.M. They pass through Richland using either George Washington Way or SR 240.

There are presently 7 commuter buses linking Pasco and Kennewick to the Hanford Reservation work site. These buses operate at 30% - 50% capacity carrying 15 to 30 people per day. There are presently 25 van pools using the SR 240 corridor carrying 12 people per van on a daily basis. According to the BFTA the van pools have been very successful and are preferred over bus use because of their flexibility. BFTA likes this mode because it's easier and lower cost to upgrade than a full-size bus. Based on current boardings the estimated daily occupancy of buses and van pools to Hanford is 450.

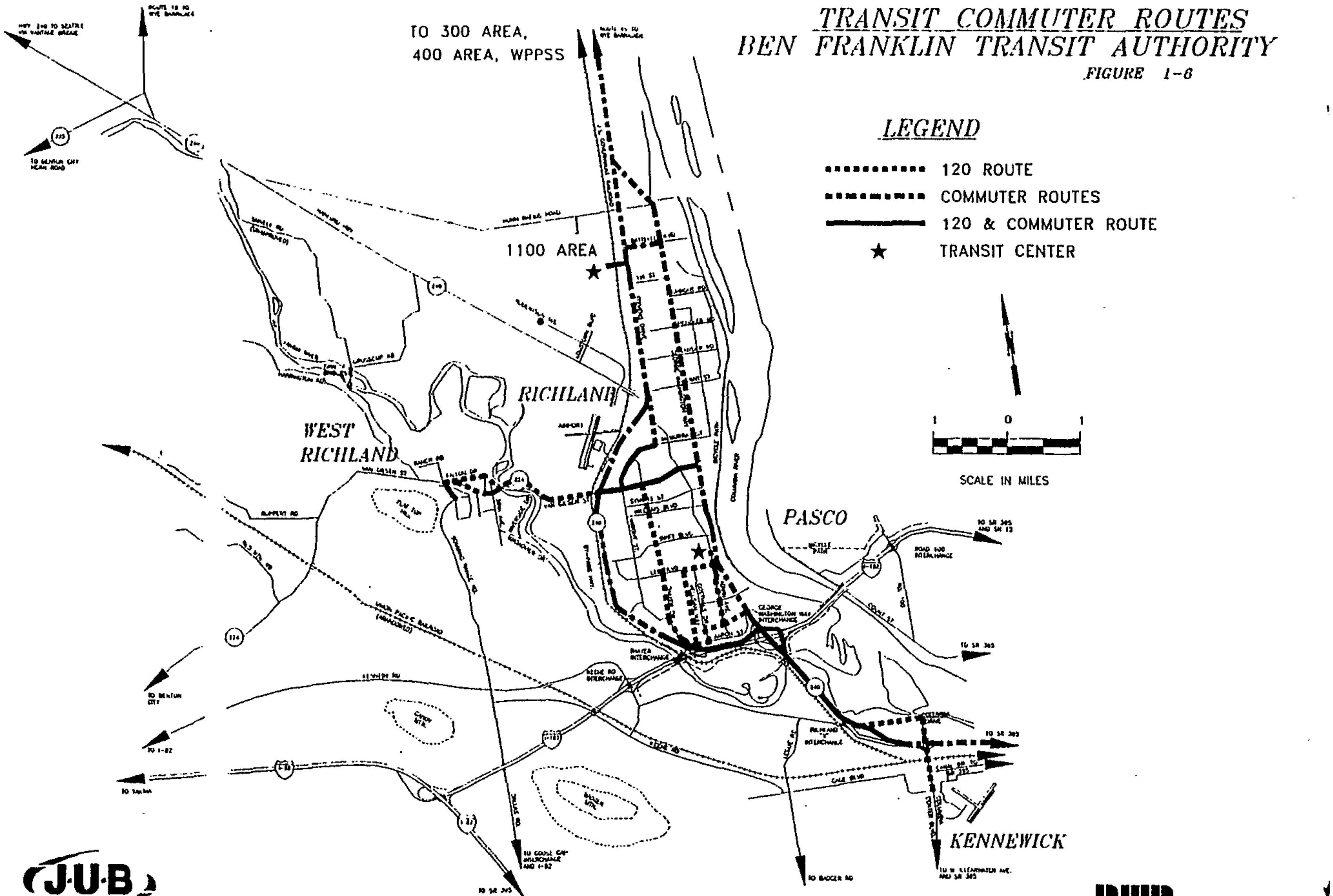
The BFTA transit system works in conjunction with the Hanford Transit System (HTS) operating at the 1100 Area. The HTS provides commuter routes within Richland and serves the outer area of the Hanford Reservation while BFTA serves the less appealing close-in points at the 200 Area, 400 Area, 1100 Area, 3000 Area and WPPSS. The high single occupancy rates identified in the previous section may be affiliated to commuters who do not want to transfer at the 1100 Area for commute to the outer areas of Hanford.

Bicycle/Pedestrian/Equestrian Routes

Bicycle/Pedestrian paths are available along the Columbia River and the Yakima River on the east and south side of the study area. These paths follow the river from Hills Street on the north to I-182 on the south. At the southern end, the paths cross under both I-182 and SR 240. At that point the path splits and continues south adjacent to SR 240 and north between SR 240 and the Yakima River. The southbound route is paved and follows SR 240 to the Richland Wye Interchange where it splits again going east and west along Columbia Drive. The northbound route turns to dirt trails just after the Thayer Drive Interchange. There are riding stables just off Van Giesen Road in Richland. Equestrians use the dirt trails in this corridor between the Yakima River and SR 240 for riding. Mountain bikes and fishermen use these trails as well.

TRANSIT COMMUTER ROUTES
BEN FRANKLIN TRANSIT AUTHORITY

FIGURE 1-6



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Although SR 240 does not have a paved bike path or lane north of the Thayer Drive Interchange, it has been designated as an existing bike route from the Thayer Drive Interchange to Horn Road by the Tri-Cities Bicycle Club and Benton Franklin Regional Council. Figure 1-7 illustrates the existing bicycle/pedestrian and equestrian routes within the study area recently approved by the City of Richland, and includes the currently approved future bike path east of the SR 240 Bypass.

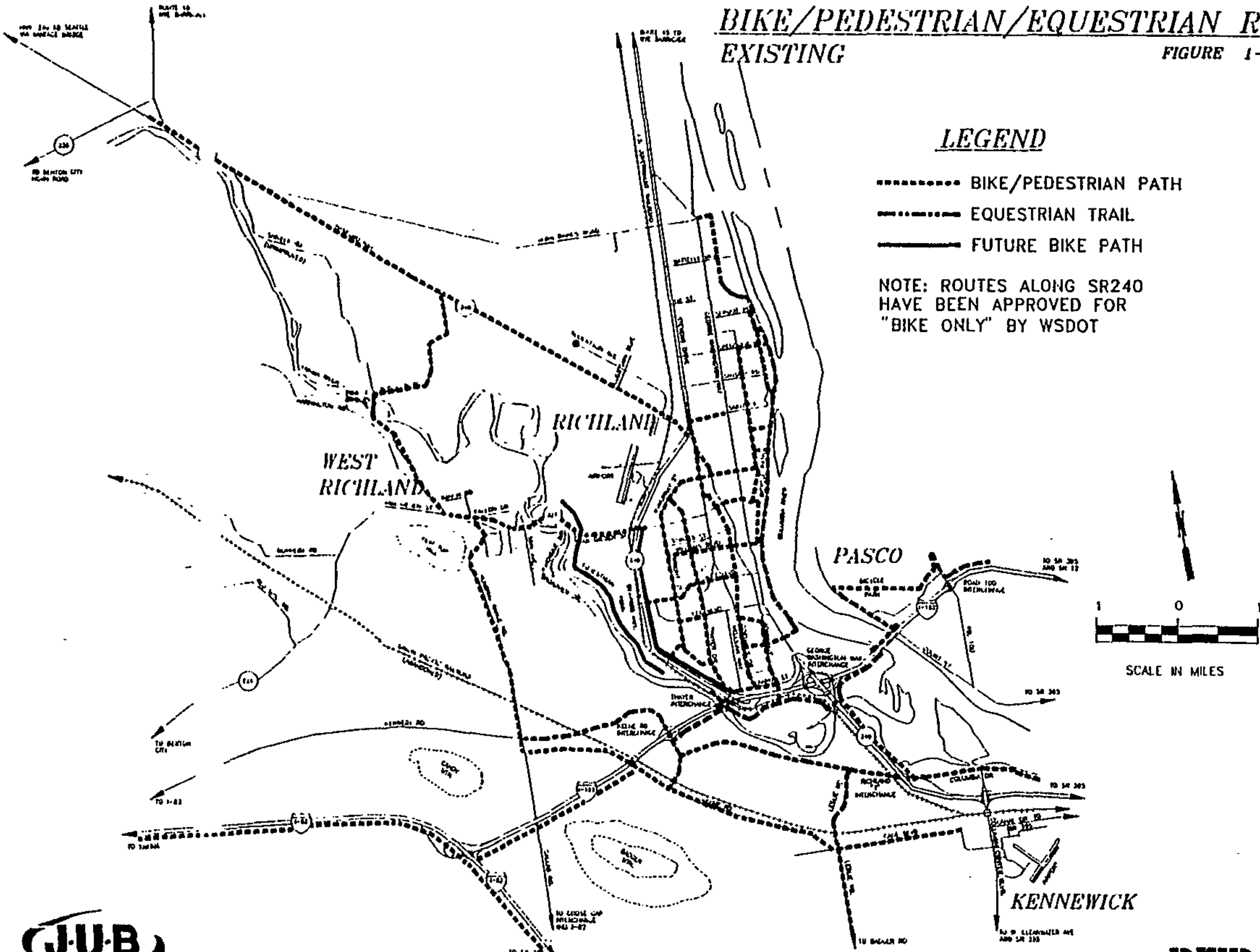
Intersection Operation

Intersection capacity analysis is generally performed for the peak hour of an average day because the peak hour represents the most severe traffic condition which occurs on a regular basis. Capacity analysis is based on a series of procedures described in the Federal Highway Administration sponsored publication "The 1985 Highway Capacity Manual" (HCM). Using this procedure, quality of traffic operation is graded into one of six levels: A, B, C, D, E or F. Levels-of-Service A and B represent the best traffic operation, Levels C and D represent acceptable traffic operation, and Levels E and F represent high levels of congestion. The Regional Transportation Planning Organization (RTPO) for the Tri-Cities area will evaluate and define a regionally acceptable intersection service standard. For the purposes of this study, the standard will be LOS C, except in individual cases where costs of improvements exceed benefits.

The Capacity Manual provides different criteria for evaluating Levels-of-Service on signalized intersections and unsignalized intersections. The procedure and results for the two methodologies are described in the next sections.

BIKE/PEDESTRIAN/EQUESTRIAN ROUTES
EXISTING

FIGURE 1-7



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Signalized Intersections

The Level-of-Service for signalized intersections is based on a calculated average vehicle delay incurred by vehicles entering the intersection during the peak hour. As the traffic volume entering the intersection increases toward the theoretical capacity of the intersection, the average vehicle delay increases. The signalized intersection Level-of-Service grading criteria is summarized in Table 1-3 (HCM Table No. 9-1).

TABLE 1-3
LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level-of-Service	Stopped Delay Per Vehicle (Sec.)
A	5.0 or less
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	Over 60.0

Unsignalized Intersections

Level-of-Service at unsignalized intersections is determined for all movements which must stop or yield for through traffic. The Level-of-Service for such traffic movements is based on the amount of unused traffic capacity for each movement, as summarized in Table 1-4.

The results of the capacity analysis for selected intersections in the study area are summarized in Table 1-5 and Table 1-6. Of the signalized intersections evaluated, the intersections at SR 240/Van Giesen Street. SR 240 Hanford Highway/SR 240 Bypass. SR 240/I-182 Interchange. George Washington Way/Spengler Road, George Washington Way/Swift Boulevard, George Washington Way/Lee Boulevard, Jadwin Avenue/Lee Boulevard, and the Columbia Center Boulevard/SR 240 South Ramps were shown to operate with excessive vehicle delay.

The capacity analysis for unsignalized intersections also indicates a poor level of operation for the intersection of traffic at SR 240 and Duportail Street in the western portion of the study area. This is due primarily to the difficulty of traffic entering SR 240 during peak conditions, while SR 240 traffic operates well.

TABLE 1-4
Level-Of-Service Criteria For Unsignalized Intersection

Reserve Capacity (PCPH)	Level- of-Service	Expected Delay to Minor Street Traffic
400 or more	A	Little or no delay
300-399	B	Short traffic delays
200-299	C	Average traffic delays
100-199	D	Long traffic delays
0-99	E	Very long traffic delay
*	F	*

* When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing, which may cause severe congestion affecting other traffic movements in the intersection.
PCPH Passenger car equivalent per hour
Source: HCM Table No. 10-3

TABLE 1-5
Signalized Intersection Level-Of-Service
P.M. Peak Hour

Location	LOS	Delay
SR 240 Hanford Highway/SR 240 Bypass Highway	F	>120
SR 240/Van Giesen Street	F	87.8
SR 240/I-182 Interchange	D	30.4
George Washington Way/Saint Boulevard	B	9.1
George Washington Way/Spengler Road	E	54.8
George Washington Way/McMurray Street	B	6.4
George Washington Way/Van Giesen Street	B	11.0
George Washington Way/Swift Boulevard	F	>120
George Washington Way/Lee Boulevard	F	>120
George Washington Way/Jadwin Avenue	C	18.4
Jadwin Avenue/Williams Boulevard	B	7.7
Jadwin Avenue/Lee Boulevard	D	28.6
Columbia Center Boulevard/SR 240 North Ramps	B	9.8
Columbia Center Boulevard/SR 240 South Ramps	F	>120

TABLE 1-6
STOP CONTROL INTERSECTION LEVEL-OF-SERVICE
P.M. PEAK HOUR

Location	Road	Direction		LOS	Reserve Capacity
SR 240/ Swift Boulevard	SR 240	SB	Left	C	278
	SR 240	NB	Left	D	113
	Swift	EB	All	E	49
	Swift	WB	All	B	350
SR 240/ Duportail Road	SR 240	SB	Left	B	336
	SR 240	NB	Left	D	115
	Duportail	EB	All	E	44
	Duportail	WE	All	F	-39
Lee Boulevard/ Wellsian Way	Lee	WV	Left	E	21
	Wellsian	NB	Left	F	-54
Van Giesen Street/ Thayer Drive	Van Giesen	EB	Left	A	650
	Van Giesen	WB	Left	A	724
	Thayer	NB	All	E	42
	Thayer	SB	All	D	164
Stevens Drive/ Snyder Road	Stevens	SB	Left	A	647
	Stevens	NB	Left	D	122
	Snyder	EB	All	D	132
	Snyder	WB	All	F	-15
Stevens Drive/ Saint Street	Stevens	SB	Left	A	653
	Stevens	NB	Left	D	123
	Saint	EB	All	C	201
	Saint	WB	All	E	9
Stevens Drive/ Horn Rapids Road	Stevens	SB	Left	A	955
	Stevens	NB	Left	E	99
	Horn Rapids	EB	All	E	9
	Horn Rapids	WB	All	F	-205
George Washington Way/ Horn Rapids Road	George Wa.	SB	Left	A	987
	George Wa.	NB	Left	A	581
	Horn Rapids	EB	All	A	659
	Horn Rapids	WB	All	B	395

Roadway and Highway Operation

Highway capacity analysis is also generally performed for the peak hour of an average day, and is based on the HCM procedures. The Highway Capacity Manual provides different criteria for evaluating Levels-of-Service on multi-lane and two-lane facilities. The procedure and results for the two methodologies are described in the next sections. Several roadway segments have been included in this analysis, even though they are not classified as highways.

Multi-Lane Highways

The Level-of-Service for multi-lane highways is defined in terms of density. Density is a measure which quantifies the proximity to other vehicles in the traffic stream. It expresses the degree of maneuverability within the stream. The multi-lane highway Level-of-Service grading criteria is summarized in Table 1-7 (HCM page 7-6).

TABLE 1-7
LEVEL-OF-SERVICE FOR MULTI-LANE HIGHWAYS

Level-Of-Service	Maximum Density (PC/MI/Lane)
A	12
B	20
C	30
D	42
E	67

Two-Lane Roadways

Level-of-Service at two-lane highways is determined by both mobility and accessibility. The primary measure of service quality is percent time delay, with speed and capacity utilization used as secondary measures. This data translates the roadways into a service flow rate. The Level-of-Service for two-lane highways grading criteria varies with speed and other parameters.

The results of the capacity analysis for selected roadways in the study area are summarized in Table 1-8 and Table 1-9. Many roadways analyzed within the study area were observed to have significant P.M. peak hour volumes in one direction and significant A.M. peak hour volumes in the opposite direction.

Of the roadways evaluated, SR 240 between the I-182 and Columbia Center Boulevard was shown to operate at a low Level-of-Service, primarily for the eastbound direction. Although the westbound direction currently operates at a Level-of-Service C. Kennedy Road and Keene Road operate well in the P.M. peak hour period, yet there is an indication that significant traffic presently uses these roads to commute to town and Hanford. Stevens Drive from Horn Rapids Road to SR 240 is heavily congested during P.M. peak hour periods.

Freeway Ramps

Ramp capacity analysis is generally performed for the peak hour of an average day and is based on the procedures outlined in the HCM. The Level-of-Service criteria for merging (on) and diverging (off) ramps is based on freeway service flow rates. These flow rates are established to permit the freeway to operate as a whole within the vicinity of the ramps. The highway ramp Level-of-Service grading criteria is summarized in Table 1-10 (HCM Table 5-1).

TABLE 1-8
Multi-Lane Highway Level-Of-Service
P.M. Peak Hour

Location	From To	Lanes	ADT	DIR	VPH	DENSITY (PCPMPL)	LOS	DIR	VPH	DENSITY (PCPMPL)	LOS
I-182	Keene Road to Thayer Road	4	12,415	WB	996	10.7	A	EB	1030*	11.0	A
I-182	Thayer Road to George Washington Way	7	21,831	WB	1439*	10.3	A	EB	2005	14.3	B
I-182	George Washington Way to Road 100	6	15,822	WB	885*	9.5	A	EB	1240	8.9	A
SR 240	Vantage Highway to Van Giesen Street	4	21,837	NB	2565*	28.4	D	SB	2435	27.0	C
SR 240	Swift Boulevard to I-182	4	22,333	NB	2171*	24.7	C	SB	2050	22.7	C
SR 240	I-182 to Richland Wye	4	36,319	WB	2425*	26.9	C	EB	3277	36.3	E
SR 240	Richland Wye to Columbia Center Boulevard	4	35,276	WB	2029*	21.8	C	EB	2768	29.7	D
SR 240	Columbia Center Boulevard to SR 395	4	23,627	WB	1146*	12.3	B	EB	1576	16.9	B
Stevens Drive	Route 4S to Horn Rapids Road	4	12,402	NB	2036*	22.9	C	SB	1721	19.4	B
Stevens Drive	Horn Rapids Road to SR 240	4	28,231	NB	3362*	65.4	F	SB	2903	56.5	F
SR 224	W. Richland to SR 240	4	14,249	WB	945	13.9	B	EB	552	8.1	A
Columbia Drive	Columbia Center Boulevard to Richland Wye	4	5550	WB	267	5.7	A	EB	333	7.1	A

* Peak Hour Volume is for A.M. Traffic

TABLE 1-9
TWO LANE ROADWAY LEVEL-OF-SERVICE
P.M. PEAK HOUR

Location	From To	ADT	VPH	Service Flow Rate	LOS
SR 240	West of Route 10	997	113	126	A
SR 240	Route 10 to Horn Rapids Road	2690	452	502	B
SR 240	Horn Rapids Road to Grosscup Road	2659	398	442	B
SR 240	Hagen Road to Bypass Highway (SR 240)	3380	678	753	C
SR 224(Van Giesen St)	West of Harrington Road	2892	330	367	B
Kennedy Road	West of I-182	5544	701	779	C
Kennedy Road	West of Bombing Range Rd.	804	85	94	A
Keene Road	Gage Boulevard to I-182	5974	731	812	C
Keene Road	I-182 to Dallas Road	4725	637	708	C
Columbia Drive	Richland "Y" to Kennedy Road	2077	232	258	A
Bombing Range Road	N.W. of Kennedy Road	2828	318	353	A
Horn Road	West of SR 240	1276	422	469	B
Route 10	North of SR 240	1620	330	367	A
Horn Rapids Road	Stevens Drive to SR 240	1817	418	464	B
Grosscup Road	SR 240 to Snively	780	254	282	A

TABLE 1-10
LEVEL-OF-SERVICE FOR FREEWAY RAMPS

Level-of-Service	Merge Flow Rate	Diverge Flow Rate
A	600	650
B	1,000	1,050
C	1,450	1,500
D	1,750	1,800
E	2,000	2,000

The results of the capacity analysis for selected interchange ramps in the study area are summarized in Table 1-11. Many of the ramps are experiencing poor operations during peak periods, particularly the ramps which function for heavy commuter traffic to and from Hanford. The heaviest levels of operation occur at the I-182/George Washington Way interchange and the SR 240/Columbia Center Boulevard interchange, particularly eastbound P.M. traffic.

TABLE 1-11
LEVEL-OF-SERVICE FOR FREEWAY RAMPS

LOCATION	INTERCHANGE RAMP	DIR	RAMP VPH	SERVICE FLOW RATE	LOS
I-182	**Thayer Road Interchange**				
	SR 240 southbound to Yakima	MERGE	911	1541	D
	SR 240 southbound to Kenn/Pasco (I-182)	WEAVE	1533	1430	C
I-182	**George Washington Way**				
	George Wash. Way southbound to Kennewick (SR 240)	MERGE	1959	2370	F
	George Wash. Way southbound to Pasco (I-182)	MERGE	734	844	B
	SR 240 northbound to George Wash. Way	DIVERGE	1689*	1810	E
	SR 240 northbound to Yakima (I-182)	DIVERGE	1292*	597	B
	I-182 eastbound to Kennewick (SR 240)	DIVERGE	1326	1389	C
SR 240	**Richland Wye Interchange**				
	Eastbound Exit	DIVERGE	751	1713	D
	Westbound Enter	MERGE	[illegible]88*	1377	C
SR 240	**Columbia Center Boulevard**				
	Eastbound Exit	DIVERGE	1648	2179	F
	Westbound Enter	WEAVE	1297*	1872	E

* A.M. Peak Hour Volumes

Traffic Safety

An important component of the evaluation of a study area is traffic safety. The goal of a transportation system is to move people and goods in both a safe and efficient manner. Within any area, certain locations will have a higher incidence of accidents than others.

Accident data was obtained for the major street system from the Washington State Department of Transportation, the City of Richland, City of Kennewick and from Benton County. The accident information was coded to street segments. Traffic statistics were produced to determine the relative difference of accident rates in the study area. This level of analysis does not provide detailed information as to the type and cause of accidents at a specific location. It does, however, provide an indication of accident problem location and severity, and can be used to identify locations for further, more detailed analysis.

The results of the area-wide accident analysis are listed in Table 1-12. The results are indicated for accidents per million vehicle miles traveled. Listed in the table are those locations where the value exceeds 0.15. This value provided a measure of the higher accident locations, controlled for the length of street segment, and the travel on the street segment. Two of the higher accident locations are situated between interchanges in the southern portion of the study area. I-182 between George Washington Way and Thayer interchange ranks high in accidents per million vehicle miles traveled. In the western portion of the study area, SR 224 was one of the locations with a relatively high accident rate.

Traffic accidents often occur at intersections of street segments. This is often a result of conflicting turn movements or intersection stop control. Accident statistics were analyzed to determine the accident rate of major intersections within the study area. The accident rate is accidents per million entering vehicles. Accident rates are listed in Table 1-13. Figure 1-8 depicts the accident locations between the period 1989-1990.

TABLE 1-12
ACCIDENT PER MILLION VMT
(LISTING OF LOCATIONS WHICH EXCEEDS 0.15)

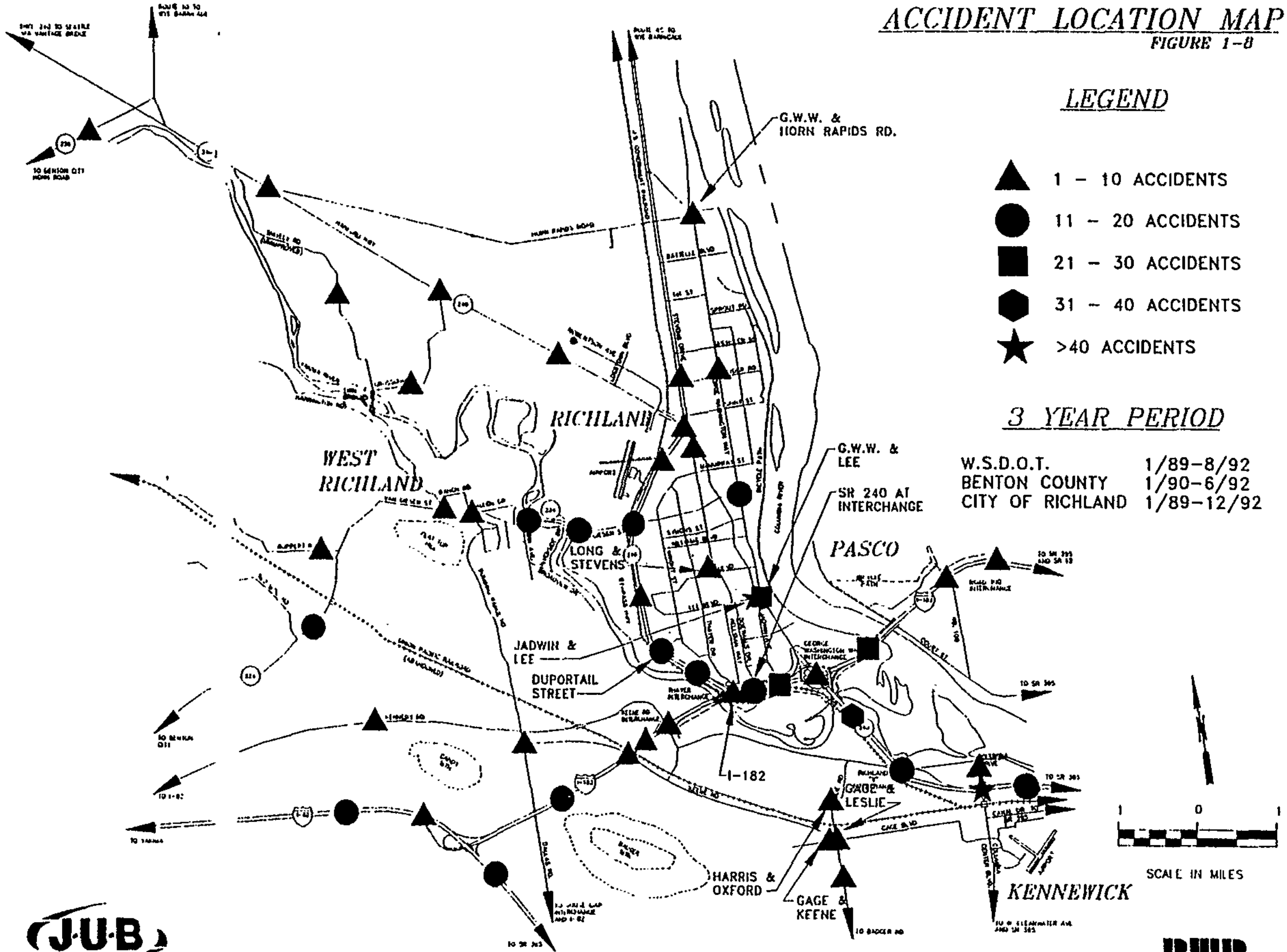
Street/Road Name	From	To	Miles	Accidents per Year	ADT	Accident Million VMT
SR 224(Van Giesen St)	M.P. Marker #3	62nd Avenue	3.59	5.00	4212	0.91
I-182	GWW Interchange	Thayer Interchange	1.12	7.67	31794	0.59
Grosscup Road	Twin Bridges	SR 240	2.30	0.80	2138	0.45
SR 240 Bypass Highway	Thayer Interchange	Duportail Street	1.00	3.67	22333	0.45
SR 240	CCB Interchange	M.P. #39 (@1 Mi. East)	1.00	5.00	34409	0.40
I-182	GWW Interchange	Road 100 Interchange	2.36	7.67	23042	0.39
SR 240	Grosscup Road	Logstown Boulevard	3.14	1.00	3412	0.26
Leslie Road	Gage Boulevard	Badger Road	2.10	1.20	7814	0.20
Kennedy Road	Columbia Drive	@ 6 mi. from Kennedy towards I82	6.00	2.00	5544	0.16

TABLE 1-13
INTERSECTION ACCIDENT RATES

Intersection	Average Daily Entering Vehicles	Average Accidents (per year)	Recorded Accident Period	Accidents\Mil. Entering Vehicles
Jadwin Avenue & Lee Boulevard	11066	14.67	(1/89-12/92)	3.63
GWW & Lee Boulevard	18009	8.00	(1/89-12/92)	1.22
Columbia Drive SE & Kennedy Rd.	4111	1.60	(1/90-6/92)	1.07

ACCIDENT LOCATION MAP

FIGURE 1-8



SR 240 METROPOLITAN TRANSPORTATION STUDY

Assessment of Existing Conditions

The compilation of transportation data has only limited value in itself. It is the correct interpretation of the data, and it's application to locally accepted values, which adds significance to this study. The assessment of existing traffic conditions has been performed by analyzing traffic volumes, street capacity, accident statistics, and the input provided by local transportation officials.

An assessment of existing traffic circulation is shown in Figure 1-9. The assessment indicates traffic capacity problems which relate to insufficient street capacity, or traffic safety problems relating to accident frequency. Traffic capacity problem locations include the intersections along Stevens Drive between Horn Rapids Road and SR 240, Lee Boulevard at Wellsian Way, Jadwin Avenue and George Washington Way, The SR 240 Bypass at Van Giesen Street, Duportail Road and I-182, and the Columbia Center Interchange of SR 240.

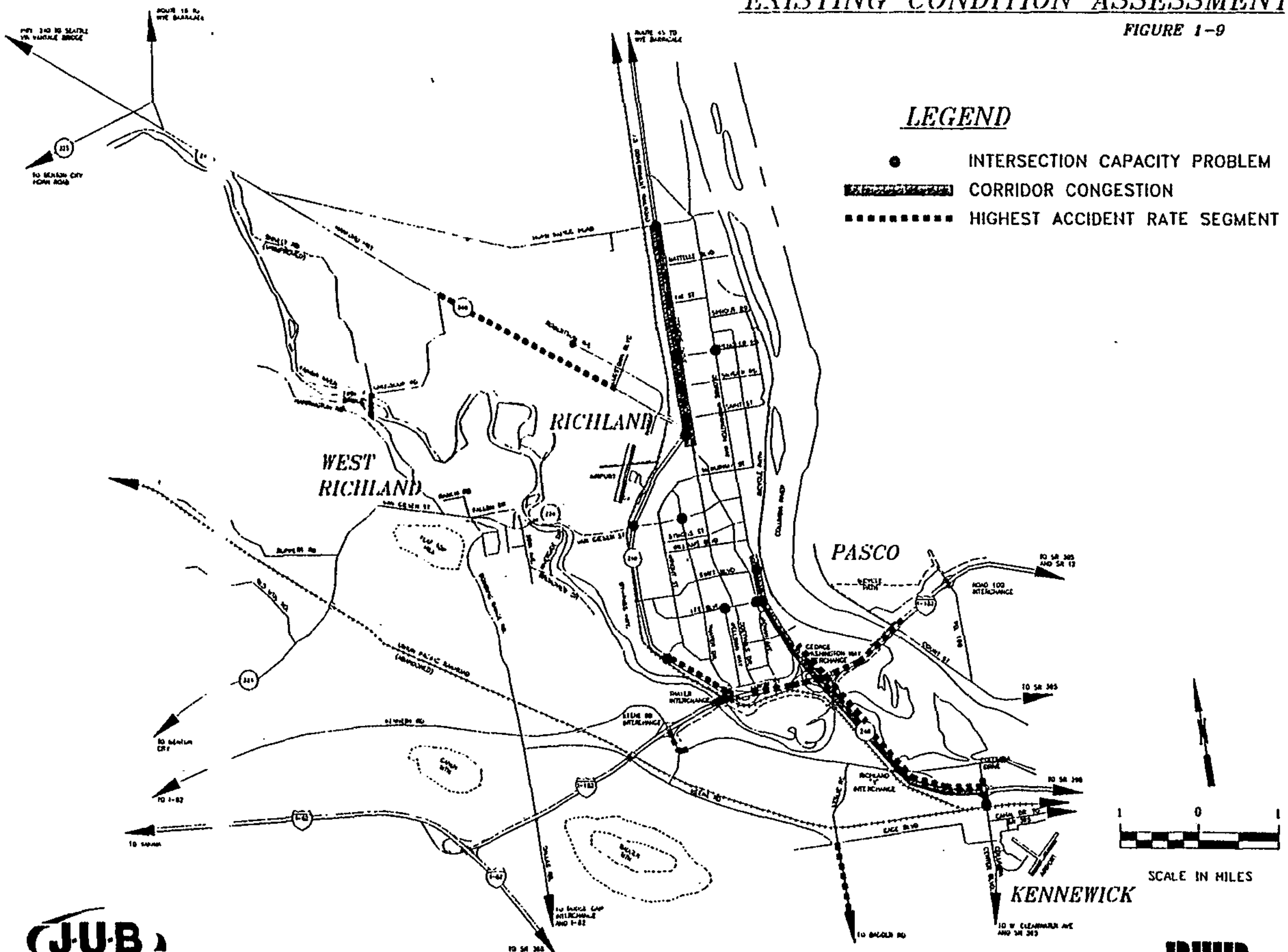
The entire Stevens Drive corridor from Horn Rapids Road to SR 240 operates at a poor Level-of-Service at P.M. peak hour periods. The SR 240 corridor between I-182 and Columbia Center Boulevard also operates poorly, particularly during P.M. peak traffic periods.

Traffic Safety problems include the locations which exceed one standard deviation of the average accident rate per segment. The primary segments of safety concern were observed on I-182 from the Thayer Interchange to the George Washington Way Interchange. Both the intersections of Lee Boulevard at Jadwin Avenue and George Washington Way were observed to be high.

Solutions for the traffic capacity deficiencies identified in this section will be described in Section 2. The information inventoried in this section will also be used to develop and refine a transportation simulation model of the SR 240 metropolitan area. This model and its application will also be described in Section 2 and in the Appendix.

EXISTING CONDITION ASSESSMENT

FIGURE 1-9



SR 240 METROPOLITAN TRANSPORTATION STUDY

SECTION 2

ANALYSIS OF FUTURE CONDITIONS

Introduction

One purpose of this study is to define transportation mobility problems within the SR 240 Corridor which both currently exist or are likely to exist in the future. Current transportation conditions were described in Section 1. Past growth trends as well as future growth potential are also described. Future population and employment growth is likely to worsen traffic conditions currently being experienced. This study provides a systematic analysis of potential transportation mobility solutions to existing and future corridor congestion problems.

The SR 240 Corridor through Richland, Washington is comprised of a series of north-south arterial routes. These routes connect Hanford, located at the northern end of the corridor, to Richland and Kennewick located to the south. Traffic flow from Hanford to West Richland and Pasco must also use the SR 240 corridor. The north-south routes include SR 240, George Washington Way, Stevens Drive, and Jadwin Avenue.

A wide range of potential transportation solutions have been investigated as part of this study. Solutions or approaches that were developed by the Steering Committee included the following:

- Increasing the traffic carrying capacity of SR 240 by re-constructing Stevens Drive/SR 240 as a freeway facility;

- Increasing the traffic carrying capacity of SR 240 by widening Stevens Drive/SR 240 to six lanes and signalizing major cross streets;

- Constructing a new route connecting to West Richland from Horn Rapids Road and continuing to Bombing Range Road to potentially divert traffic from the SR 240 corridor to this route;

- Constructing a new bridge across the Columbia River at Horn Rapids Road to connect with Road 68 and US 395 in Franklin County. This project was previously studied as a toll facility and it is included as such in this study;

- Examining whether transportation demand management solutions which reduce peak hour trips would be sufficient to reduce future year traffic congestion problems. This alternative is described in more detail later in this section; and

- Examining non-motorized transportation solutions such as bicycle or pedestrian improvements.

Public Comments

In addition to the above potential solutions developed by the Steering Committee, several comments and suggestions were received from the public during the two public meetings held during the course of the study. Some of these public comments duplicated the Steering Committee recommendations. Some of the comments were outside of the scope of this study and were passed on to the appropriate local agency. Copies of letters or other public correspondence can be found in Appendix C. The comments received from the public are as follows:

- Reverse the short-cut trend on Stevens between McMurray and Lee without having to widen the roadway;
- Improve bus service to Hanford;
- Construct Steptoe as relief to Columbia Center Boulevard;
- Widen SR 240;
- Consideration should be given for emergency evacuation for the Horn Rapids area;
- Construct a left turn lane on George Washington Way at Sprout;
- Consider a bi-directional lane on SR 240 and the bypass;
- Construct an urban interchange at Van Giesen/SR 240;

- Reduce commuter traffic to Hanford;
- Consolidate Ben Franklin Transit with Hanford bus service;
- Improve bike facilities in Richland;
- Increase shuttle service to Hanford; and
- Extend Kingston or Jones to 300 area.

TRANSPORTATION DEMAND MANAGEMENT

Throughout the country, communities face steadily increasing traffic congestion and deteriorating air quality usually as a result of growth and greater use of the automobile. Whereas building new roads used to be the only solution to congestion problems, capital improvement funds now must compete with other demands. Increasing environmental concerns and state taxation policy issues complicate the problem. However, congestion and air quality problems are not necessarily the inevitable outcome of economic growth.

A major cause of morning and evening peak period congestion is the daily commute to and from work. In section one of this report it was shown that nearly 90 percent of the vehicles on SR 240 were single occupant vehicles with the average for the entire corridor at 87 percent. Although not identified in the study, the shopping, school, or vacation related trips usually involve multi-occupancy vehicles and occur during the non-peak periods.

Since commute trips are a major source of the congestion deterioration problem, a reduction in the number of these trips is one solution. And since commuters, unlike shoppers and vacation travelers, are people with similar schedules, needs, concerns, destinations, and habits, this group can make a significant contribution to the solution.

Transportation Demand Management (TDM) is an alternative that places the emphasis on reducing the travel demand rather than constructing new facilities to increase the available roadway supply. In 1991, the State of Washington adopted the Commute Trip Reduction Law (CTR) which was subsequently incorporated into the Washington Clean Air Act. Its intent is to reduce congestion and improve air quality by encouraging the use of alternatives to the single-occupant vehicle for the commute trip.

The law applies to employers with one hundred or more full-time employees at a worksite, who are scheduled to begin their work day between 6:00 a.m. and 9:00 a.m. during the week, and are located in the counties with a population exceeding 150,000. The law establishes goals for reducing commute trip vehicle miles traveled and the proportion of single-occupant trips by the employees of the affected employers. The ultimate goal is a 35 percent reduction by the year 1999. Although the SR 240 study area contains employers with more than one hundred employees, the law does not affect the area since the county's population is less than 150,000.

Even though the area is not impacted by the Washington State CTR Law, it was determined by the Steering Committee that a future year scenario should be examined using the goals established by that law. The process and the results of this analysis are shown later in this report. Several different TDM strategies were implicit during the application of the TDM alternative analysis. These strategies are identified in Appendix B.

FUTURE LAND USE AND DEVELOPMENT ANALYSIS

The transportation system serves the population and industry of an area. As such, there is a direct relationship between land use and transportation. A transportation plan should be responsive to the dynamics of an area, such as population and employment change and the distribution of these activities across the urban area.

Both the Intermodal Surface Transportation and Efficiency Act (ISTEA) and the Washington State Growth Management Act have mandated the study of the land use-transportation relationship. Both acts require that transportation plans be consistent with land use plans and prescribe a balance between future land use development and infrastructure needs.

This section describes how future land use estimates were prepared and input into the transportation model. In order to assist in this process, a Technical Advisory Committee was established consisting of area transportation and planning officials. A Population and Employment Forecasting Subcommittee also met to provide valuable input into the development of future land use forecasts. The land use plan element is described in the following sections.

Population

The Growth Management Act specifies that future plans utilize population projections prepared by the Washington State Office of Financial Management (OFM). Listed in Table 2-1 are the OFM population forecasts, calculated change between periods, percent change and annual average growth rates for Benton County. The OFM projected population to the Year 2012, which is the project horizon year for this study. The Year 2012 population forecast for Benton County is 148,885.

TABLE 2-1
BENTON COUNTY POPULATION FORECAST

Year	Population	Change	Percent Change	Annual Average Growth
1990	112,560			
1995	121,328	8,768	7.79%	1.51%
2000	128,752	7,424	6.12%	1.19%
2005	136,892	[illegible],140	[illegible].32%	[illegible].23%
2010	145,453	8,561	6.25%	1.22%
2012	148,885	3,432	2.36	1.17%

Employment

Employment forecasts were prepared by area economists under contract to the Office of Financial Management. The forecasts were prepared to the Year 1997. Employment forecasts for the Hanford site to the Year 2022 were also obtained and used to develop forecasts for the region to the Year 2012.

Hanford is the largest employer in the Tri-Cities region and its employment changes have often led other employment sectors. The Hanford 30-year employment projection is shown in Figure 2-1. Hanford employment is expected to increase until the Year 2000, and then begin declining after the Year 2005.

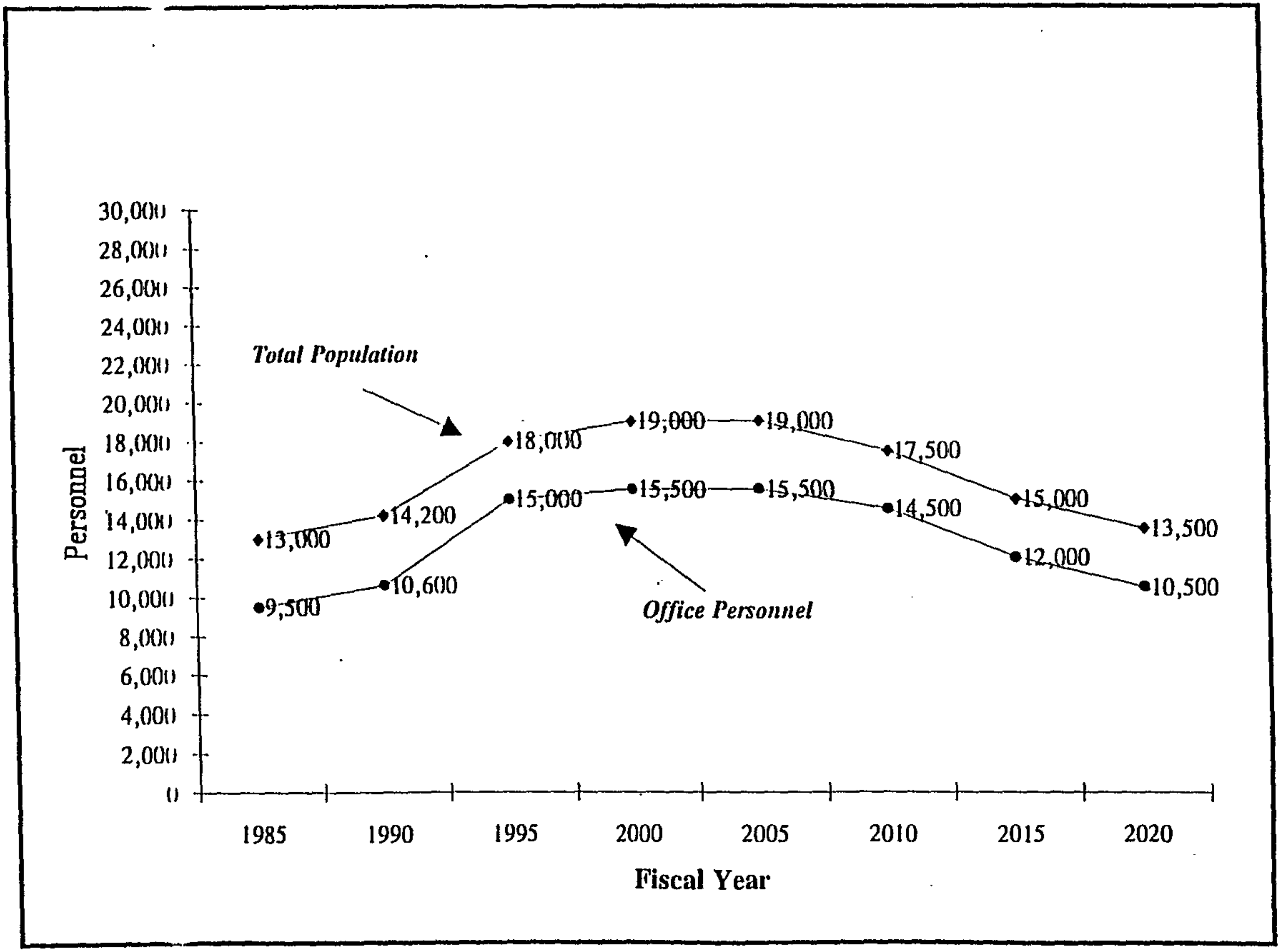
Future year employment projections developed for this study reflect a balance between the continued growth forecast in the OFM population projections and the Hanford employment projection. The employment projection for both Benton and Franklin Counties is listed in Table 2-2. The table reflects continued growth which would be expected to be consistent with the OFM population forecast, but also a lower annual average growth rate to be consistent with the Hanford employment projection. The projected Year 2012 employment for the two-county area is 81,840.

TABLE 2-2
BENTON & FRANKLIN COUNTIES EMPLOYMENT FORECAST

Year	Employment	Change	Percent Change	Annual Average Growth
1990	62,200			
1992	66,900	4,700	7.56%	3.71%
1997	73,000	6,100	9.12%	1.76%
2002	76,000	3,000	4.11%	0.81%
2012	81,840	5,840	7.68%	0.74%

HANFORD EMPLOYMENT PROJECTION

FIGURE 2-1



Distribution of Growth

The identification of probable growth patterns in the study area involved review of past development trends, a review of population and employment projections, knowledge of in-place utilities and street infrastructure and knowledge of proposed utility extensions. The Population and Employment Subcommittee, through the assistance of BFRC staff, developed a methodology to assign growth to each political jurisdiction. Planners within each jurisdiction were then able to assign their allocation of growth to smaller growth areas. The population allocation results are listed in Table 2-3.

TABLE 2-3
PRELIMINARY BENTON COUNTY POPULATION ALLOCATIONS

Jurisdiction	1991	% of Total County-wide Population	2012	Population Increase	% of Total County-wide Population
Benton County Unincorporated	28,955	25.2%	* 36,795	7,840	23%
Benton City	1,835	1.6%	2,517	682	2%
Kennewick	42,780	37.3%	** 55,732	12,952	38%
Prosser	4,470	3.9%	5,833	1,363	4%
Richland	32,740	28.5%	42,625	9,885	29%
West Richland	4,020	3.5%	5,383	1,363	4%
County-wide Totals	114,800		148,885		

* This number may be smaller due to the potential annexation of the county islands within the Kennewick city limits. The population currently within the islands would add to the city population.

** This number could be larger due to the potential annexation of county population within the unincorporated islands.

OFM Population Projection for year 2012:	148,885
Current Population and percentages: (Shaded)	114,800
Total County-wide population allocated: (OFM)	34,085

Transportation Model Input

The transportation model developed by BFRC was adapted for this study. The primary input into the model are land use variables by transportation analysis zone (TAZ). There are 138 TAZs in the SR 240 study model.

The twenty year change for the Tri-Cities modeling area is listed in Table 2-4. The projected growth for the area is reflected by increases in both housing and employment opportunities. These projections were developed by the Population and Employment Subcommittee and then adjusted by the Consultant to be consistent with the area control totals for the Year 2012.

TABLE 2-4
LAND USE GROWTH
TRI-CITIES MODEL AREA

Land Use	Base Year	Twenty Year	Change
Single Family D. U.	30,030	37,312	7,282
Multi Family D.U.	21,665	23,549	1,884
Industrial Emp.	9,667	11,467	1,800
Retail/Service Emp.	10,532	14,255	3,723
Office Emp.	9,130	11,245	2,115
Retail Square Feet	3,156,000	4,965,000	1,800,000
Office/Medical Sq. Ft.	632,000	1,690,000	1,058,000
Hanford Empl.	16,274	17,474	1,200

TRANSPORTATION IMPACTS

The purpose of this section is to identify and evaluate the need for transportation improvements to be implemented in the future. The future year, or design year, is 2012. The future land use input into the transportation model is consistent with OFM demographic forecasts.

A transportation simulation model of the SR 240 Corridor and the Tri-Cities area was used to identify expected future traffic flows and to test alternative improvement strategies. The base traffic model was provided by the Benton-Franklin Regional Council. The model was refined for application in the SR 240 Corridor.

The modeling process developed for this study involved four major steps:

- Refining the computerized street network;
- Developing a compatible land use zone system and data base;
- Calibrating the traffic simulation model to represent current traffic conditions; and
- Using the model to test alternative improvement scenarios.

This process is further described in Appendix A.

The impacts of anticipated growth were analyzed by forecasting Year 2012 travel on both the existing network and the existing network modified by adding projects in the Benton-Franklin Regional Council Transportation Improvement Program (TIP). Other improvements identified by local agencies were also included in the study. A series of seven scenarios were coded into the model and analyzed. Streets and intersections which exceeded 80 percent of capacity were identified. An analysis of intersection capacity was conducted at major intersections using the methodology described in the 1985 Highway Capacity Manual. This analysis provides a comparison of the effectiveness of the alternative improvements.

The seven scenarios presented in this report are as follows:

- Scenario 1 - No Build;
- Scenario 2 - Existing Plus TIP Projects;
- Scenario 3 - Reconstruct Stevens/SR 240 as Freeway Facilities;
- Scenario 4 - Widen SR 240/Stevens Drive to six lanes;
- Scenario 5 - West Richland Route;
- Scenario 6 - Horn Rapids Toll Bridge; and
- Scenario 7 - Transportation Demand Management.

SCENARIO 1 - NO-BUILD

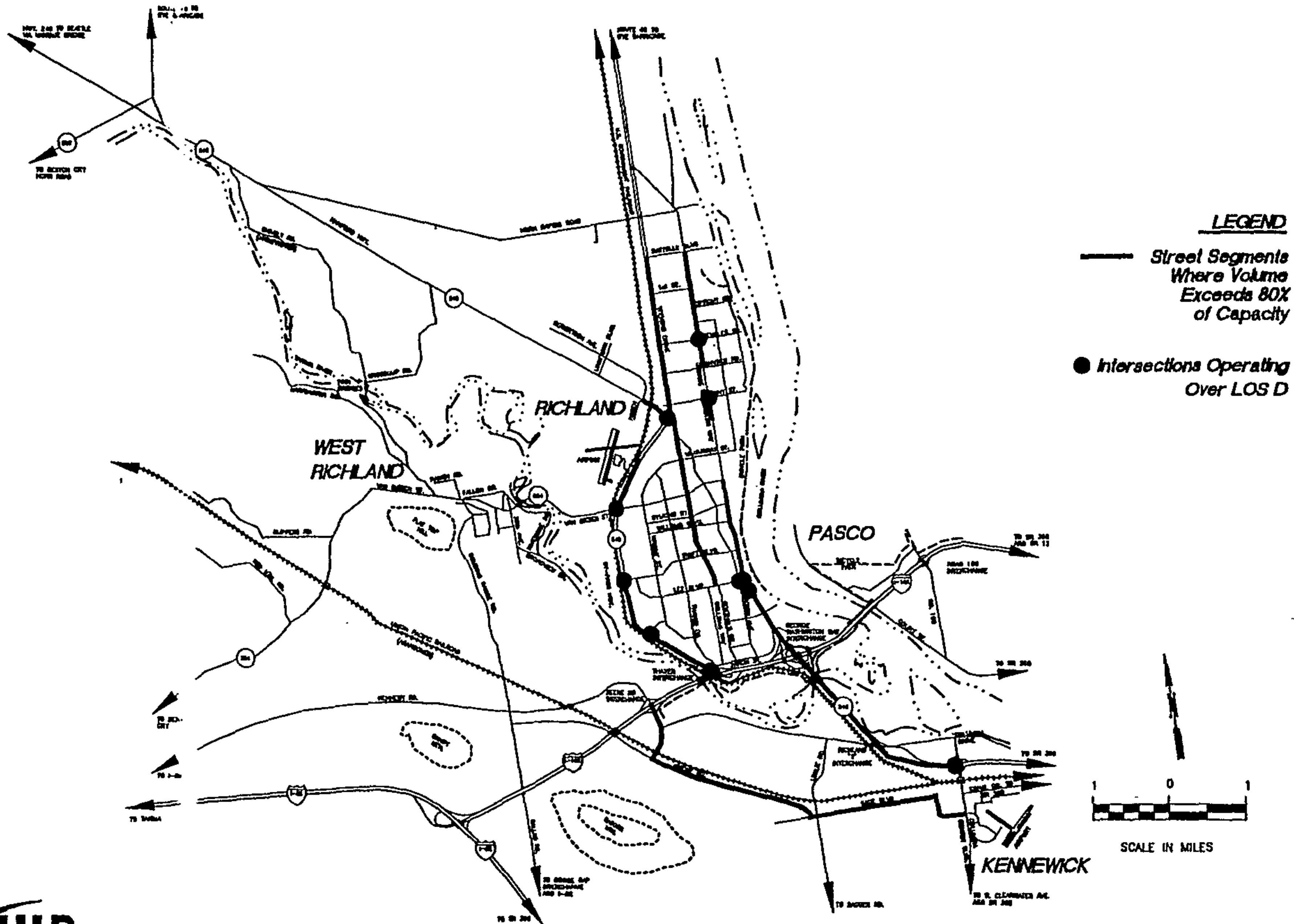
This alternative assumes the street network will remain the same with no major improvements. The results of the traffic simulation model were used to identify congested links and intersections. Congested links are considered to be those where volumes exceed 80 percent of capacity. Intersection problems were evaluated using model traffic volumes and the methodology described in the Highway Capacity Manual - Intersection Operations Analysis. While it is unlikely that no roadway improvements will be made to support future growth, this alternative allows a direct comparison of the impacts of future growth on the current street system. It also provides a benchmark by which to measure the effectiveness of proposed improvements.

Congested links and nodes are shown in Figure 2-2. The anticipated twenty-year growth will add significant traffic to the street system. Roadway segments congested during the peak hour include sections of:

- Stevens Drive (south of Bypass Highway);
- George Washington Way;
- SR 240 Bypass;
- SR 240 (I-82 to Columbia Center Blvd.);
- Lee Boulevard;
- Keene Road; and
- Gage Boulevard.

SCENARIO 1 - NO BUILD

ROADWAY DEFICIENCIES/FIGURE 2-2



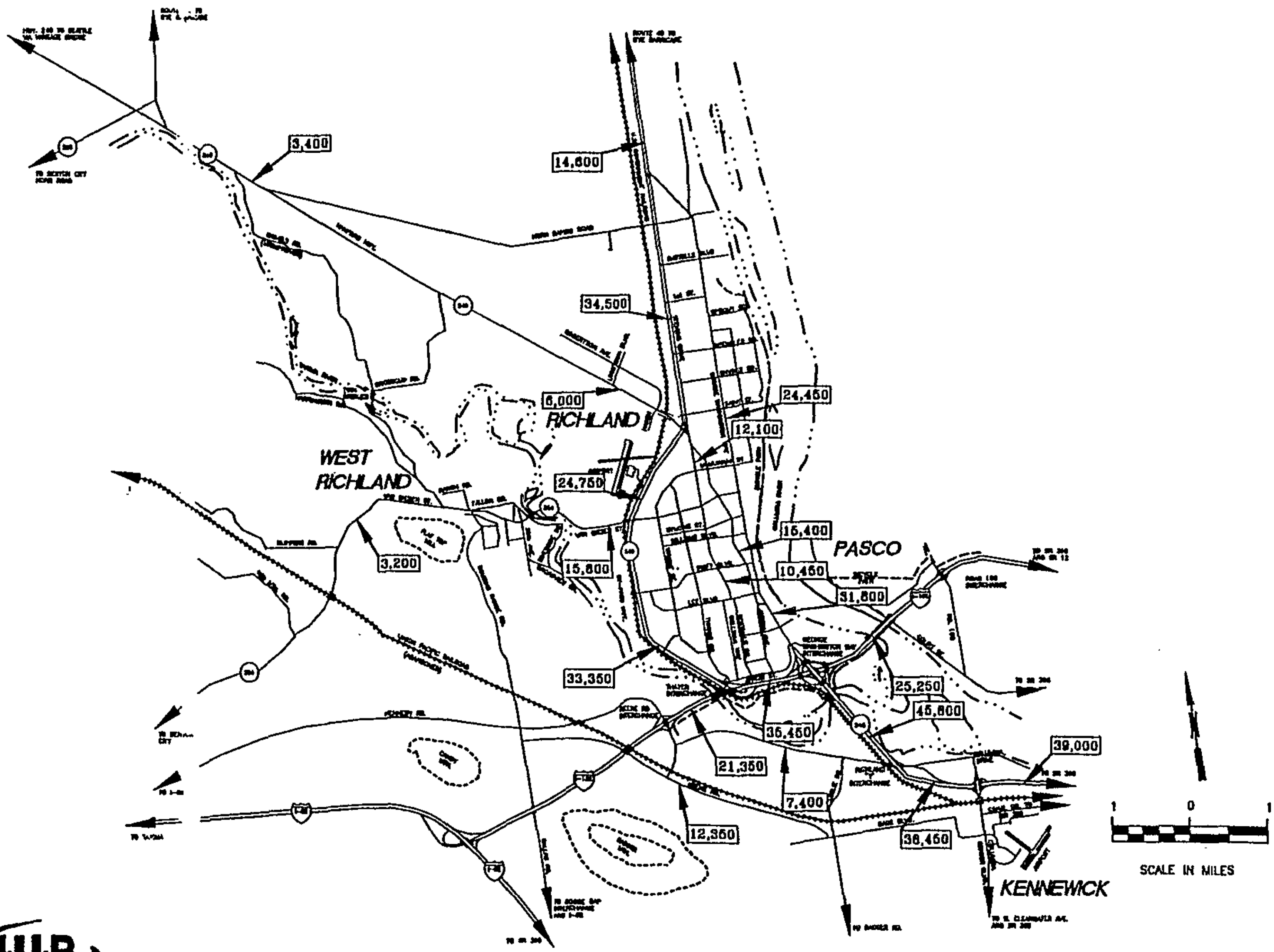
The intersections which would operate at level-of-service (LOS) E or F included:

- SR 240/Bypass Highway;
- SR 240/Van Giesen;
- SR 240/Thayer;
- SR 240/Swift (stop control);
- SR 240/Duportail (stop control);
- George Washington Way/Saint;
- George Washington Way/Spengler;
- George Washington Way/Lee;
- George Washington Way/Jadwin;
- Jadwin/Lee; and
- Columbia Center Boulevard/SR 240 South Ramps.

The projected daily volumes on selected links for the no-build scenario are depicted in Figure 2-3.

SCENARIO 1 - NO BUILD

PROJECTED DAILY TRAFFIC/FIGURE 2-3



SCENARIO 2 - EXISTING PLUS TIP PROJECTS

The TIP Projects are shown in Figure 2-4 and listed in Table 2-5. These transportation improvement projects were identified by the local agencies affected by this study. Some are only proposed but most are in the Benton-Franklin Regional Council Regional TIP. These projects are considered to have funding or are expected to be funded prior to 2012. As such, these projects were added to the existing system in order to determine whether they would address all expected future year deficiencies or whether additional projects would be needed. The estimated cost for the TIP projects has been determined by the BFRC to be $40 million.

The remaining congested links and nodes following the improvements are shown in Figure 2-5. The TIP projects were shown to improve Stevens Drive operation but would have little impact in solving SR 240 Corridor congestion problems. Roadway segments congested during the peak hour include segments of:

- SR 240 (I-182 to Columbia Center Blvd.);
- SR 240 Bypass;
- Stevens Drive (south of Bypass Highway); and
- George Washington Way.

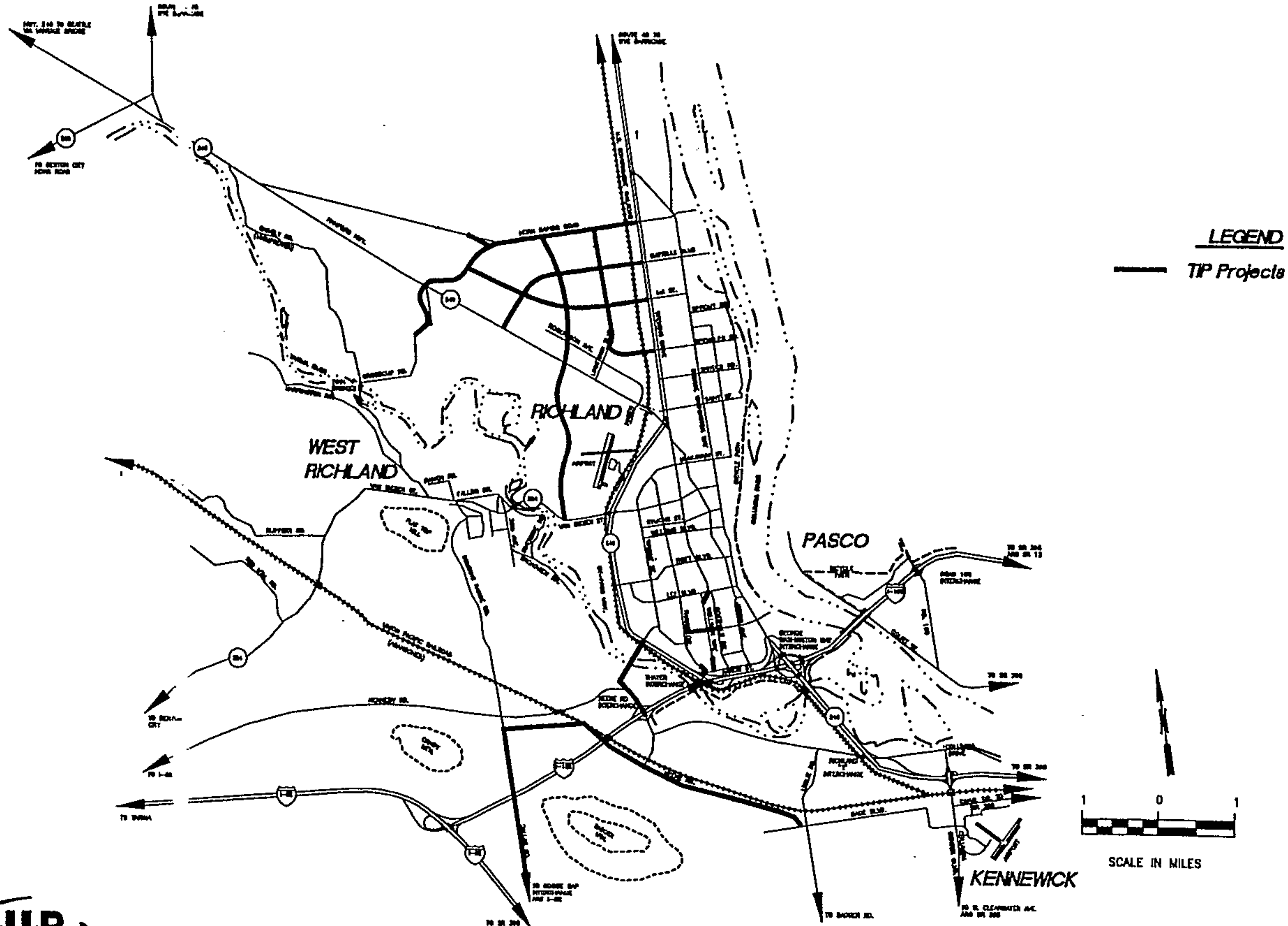
The intersections which would operate at LOS E or F included:

- George Washington Way/Spengler;
- George Washington Way/Saint;
- SR 240/Swift (stop control);
- SR 240/Duportail (stop control);
- SR 240/Bypass Highway;
- SR 240 Bypass/Van Giesen;
- SR 240 Bypass/Thayer;
- Jadwin/Lee;

- George Washington Way/Lee;
- George Washington Way/Jadwin; and
- Columbia Center Boulevard south ramps.

SCENARIO 2 - EXISTING PLUS TIP PROJECTS

FIGURE 2-4



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SCENARIO 2 - EXISTING PLUS TIP PROJECTS

ROADWAY DEFICIENCIES/FIGURE 2-5

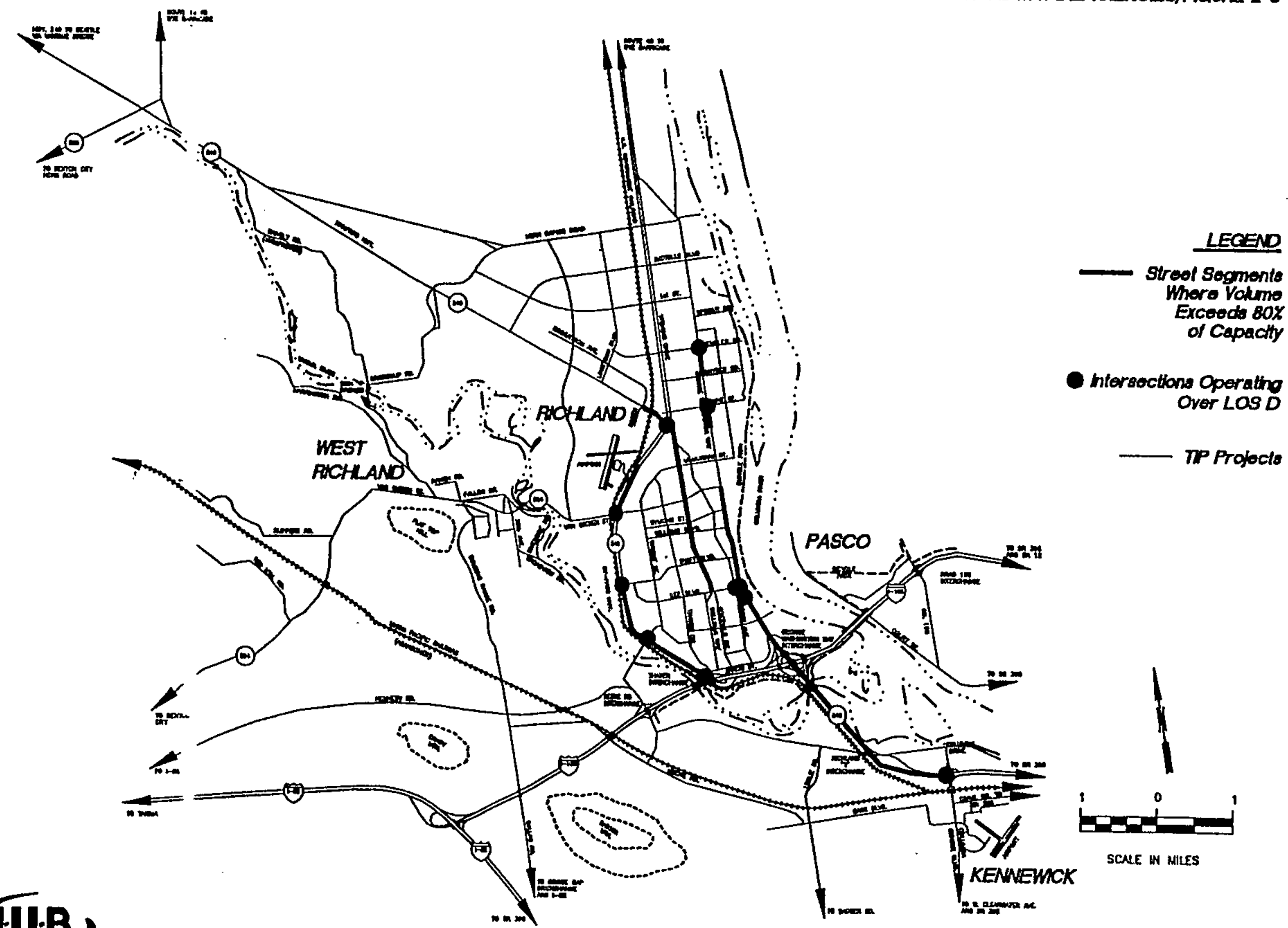


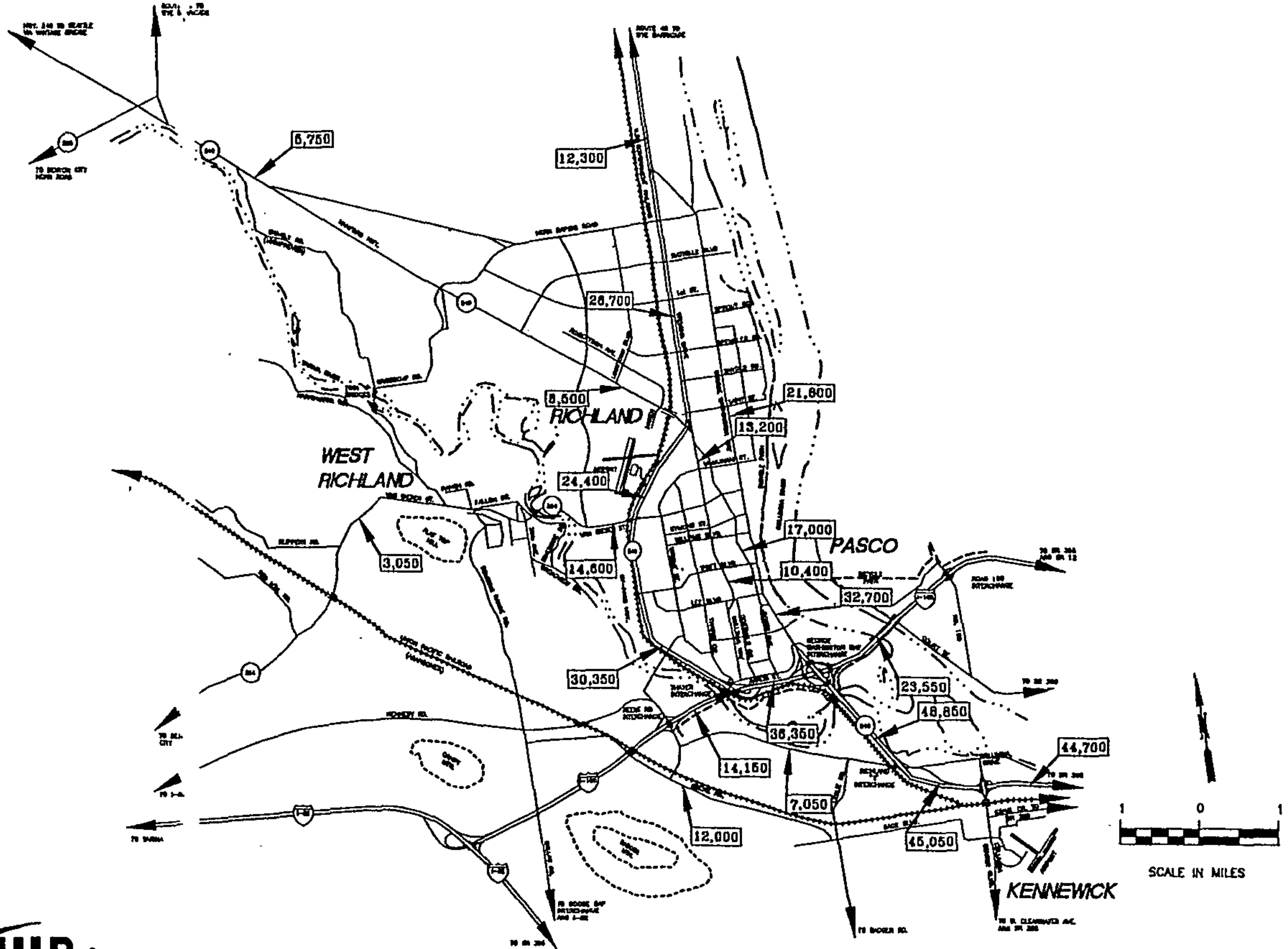
TABLE 2-5
ROADWAY CAPACITY IMPROVEMENT PROJECTS

Jurisdiction	Improvement
Richland	Horn Rapids
Richland	Horn Rapids Area proposed access projects
Richland	Battelle Blvd. extension
Richland	1st Street widening, signal at G.W.W.
Richland	Logston Street extension
Richland	Jones Road form SR 224 to Horn Rapids passing thru SR 240
Richland	Duportail extension with traffic signal at SR 240
Richland	Wellsian Way/I-182 ramp
Richland	Stevens/Wellsian connection
Richland	Bradley Street extension and signal and proposed extension of Falley Street west to Jadwin Avenue
Benton County/ Kennewick	4th Avenue widening
Benton County/ Kennewick	Edison Street interchange and widening
Kennewick	Grant Street/West Canal Drive signal
Kennewick	Young Street/West Canal Drive signal
Kennewick	Quay Street/West Canal Drive signal
Kennewick	Okanogan/Columbia Center Blvd. signal
Pasco	Lewis/Sylvester interchange
Benton County	Dallas Road; end of oil to I-82; I-82 to Badge

Year 2012 daily traffic forecasts are shown in Figure 2-6. Due to heavy Hanford traffic flow, SR 240 Corridor routes tend to carry a higher percent of traffic volume during the peak hour. Thus, in some cases, review of daily traffic can mask peak hour traffic problems. High volumes are shown on SR 240 (both north and south of I-182), Stevens Drive and on George Washington Way.

SCENARIO 2 - EXISTING PLUS TIP PROJECTS

PROJECTED DAILY TRAFFIC/FIGURE 2-6



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SCENARIO 3 - RECONSTRUCT STEVENS DRIVE/SR 240 AS FREEWAY FACILITY

The Stevens Drive/SR 240 freeway alternative consists of constructing a higher speed and capacity facility beginning at Horn Rapids Road and connecting to I-182 and continuing to Columbia Center Boulevard. Interchanges are indicated at Horn Rapids Road, 1st Street, Jadwin, Van Giesen, Duportail and Thayer. A frontage road would be required along the east side of Stevens Drive to provide a route to access points. The projected high volumes along the facility would require a six lane facility on SR 240 between I-182 and Columbia Center Boulevard. This scenario provides the advantage of moving traffic from Hanford through Richland. A disadvantage is that access to the facility would be limited to interchange locations.

The freeway alternative reduced areas of traffic congestion along George Washington Way, Jadwin, Stevens and SR 240 (Bypass Highway). Remaining congested links and nodes following the scenario improvements are shown in Figure 2-7. Sections of Stevens remained congested, but to a lesser degree than other alternatives. Peak hour volumes of over 4,000 southbound vehicles on SR 240 (Bypass Highway) would congest a four lane freeway facility. Roadway segments congested during the peak hour include segments of:

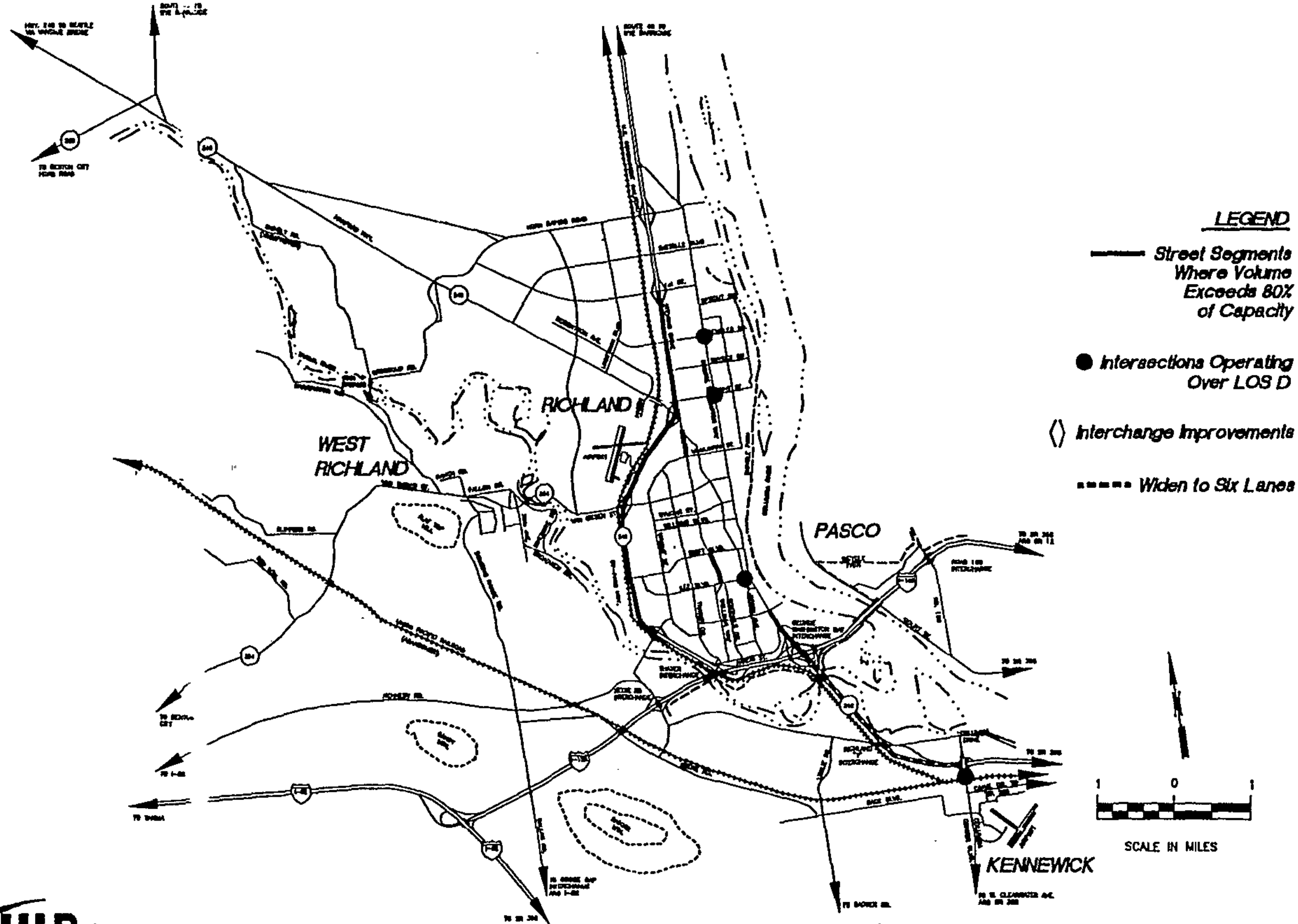
- SR 240 Bypass, and
- Stevens Drive.

Intersections which operated at LOS E or F include:

- George Washington Way/Saint;
- George Washington Way/Spengler;
- Jadwin/Lee; and
- Columbia Center/SR 240 south ramps.

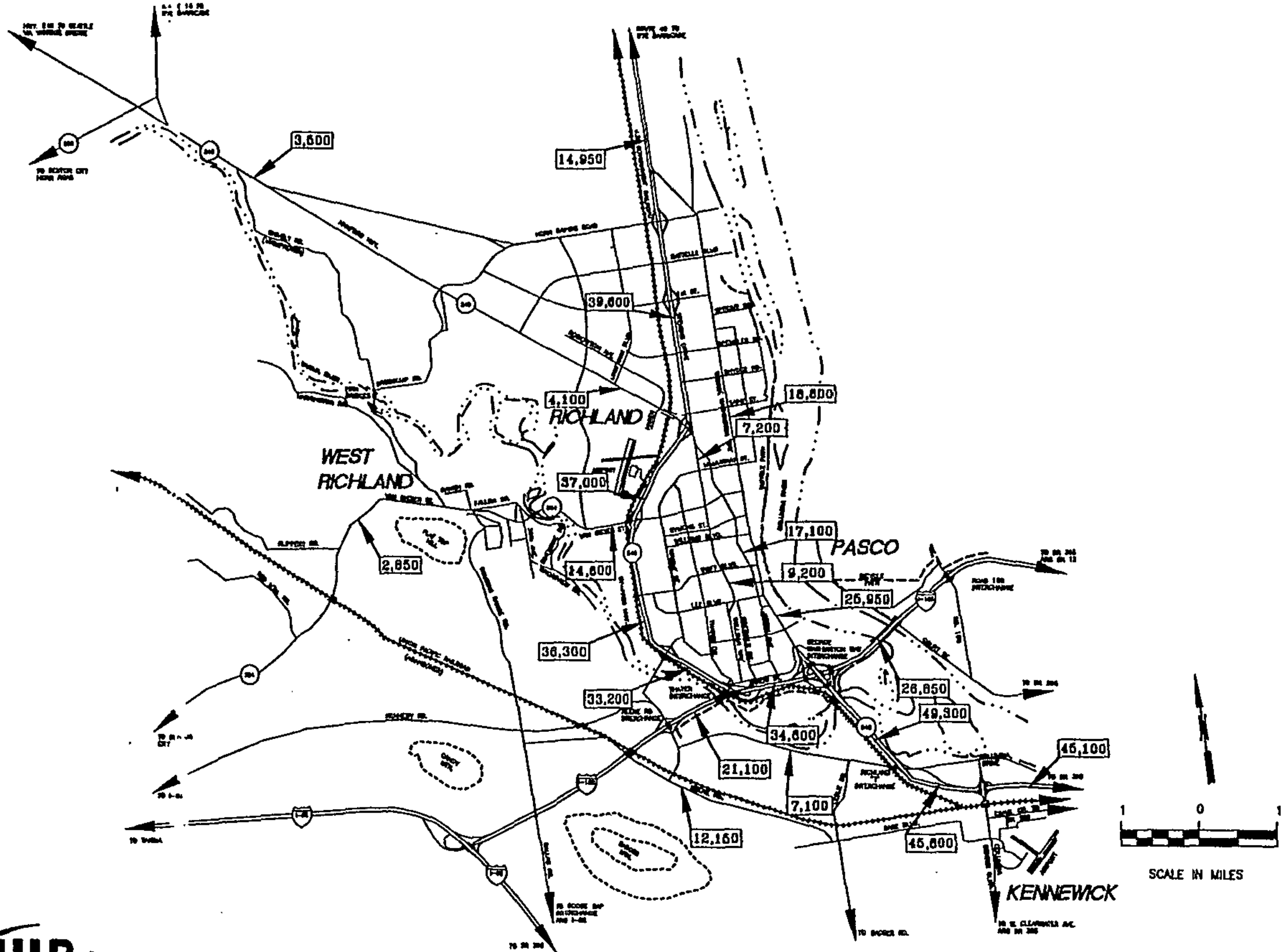
SCENARIO 3 - GRADE SEPARATION OF SR240

ROADWAY DEFICIENCES/FIGURE 2-7



SCENARIO 3 - GRADE SEPARATION OF SR240

PROJECTED DAILY TRAFFIC/FIGURE 2-8



SR 240 METROPOLITAN TRANSPORTATION STUDY

Year 2012 daily traffic forecasts are shown in Figure 2-8. SR 240/Stevens is shown to carry relatively high volumes of traffic while George Washington Way carries relatively low volumes of traffic. The highest traffic volumes remain on SR 240 south of I-182 thus justifying a six lane facility to Columbia Center Boulevard.

As previously mentioned, this scenario was intended to produce a freeway type facility from Horn Rapids Road to Columbia Center Boulevard via Stevens Drive, SR 240 Bypass, and SR 240. It was determined during the analysis of this scenario that the grade-separated interchanges at Horn Rapids Road and at 1st Street were not addressing a specified congestion problem at those locations. Also, the addition of a frontage road along the east side of Stevens Drive for access needs was determined to be unnecessary. As a result of this analysis, this scenario is evaluated later in this report as providing interchanges only at Stevens/SR 240 Bypass, Van Giesen/SR 240 Bypass, and at Duportail/SR 240 Bypass. It also assumes that the at-grade access to the airport from the bypass highway will be discontinued. Future access to the airport would need to be addressed in the design of the Van Giesen interchange with the realignment of Terminal Drive. Additionally, no at-grade access would be provided at Swift/SR 240 Bypass.

SCENARIO 4 - WIDEN SR 240/STEVENS DRIVE TO SIX LANES

Widening the SR 240/Stevens route to six lanes presents a second approach to adding capacity. Access is increased along this route by adding traffic signals at Horn Rapids Road, Battelle Boulevard, 1st Street, Spengler Road, Swift Boulevard and Duportail. The resulting loss of capacity was compensated by widening SR 240/Stevens Drive to six lanes through the Columbia Center Boulevard. This scenario also includes the TIP projects.

Remaining congested links and nodes following the scenario improvements are shown in Figure 2-9. A six lane roadway provides sufficient link capacity to accommodate SR 240/Stevens Drive volumes. The project also reduces congestion of alternate routes such as Jadwin and George Washington Way, but to a slightly lesser degree than the freeway alternative. Roadway segments congested during the peak hour include segments of:

- Stevens Drive (south of Bypass Highway); and
- George Washington Way.

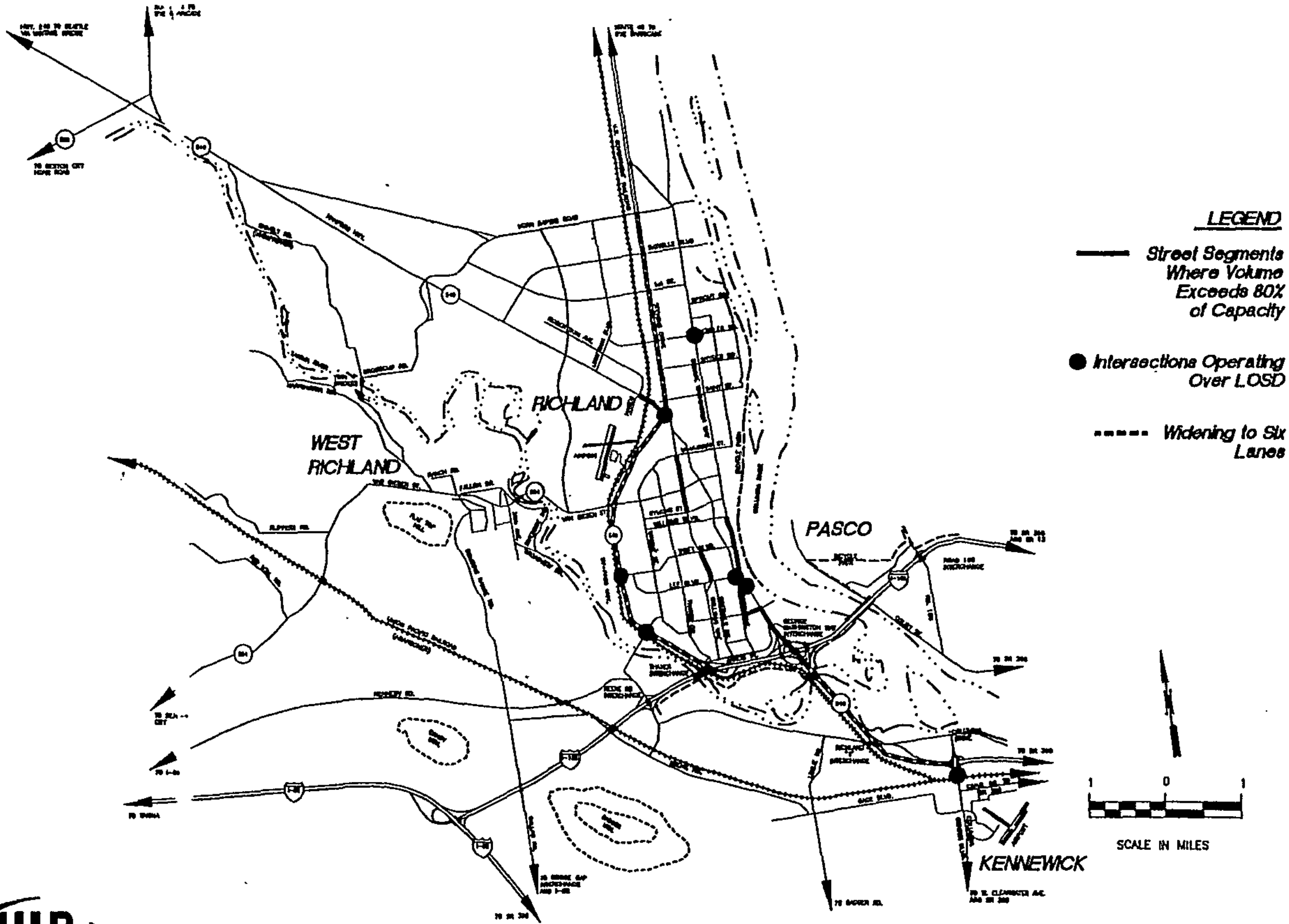
Intersections which operated at LOS E or F include:

- SR 240/Bypass Highway;
- George Washington Way/Jadwin;
- Jadwin/Lee;
- Columbia Center/SR 240 south ramps; and
- George Washington Way/Spengler.

Year 2012 daily traffic forecasts are shown in Figure 2-10. SR 240/Stevens is shown to carry relatively high volumes of traffic, but not as high as the freeway alternative. While a six lane SR 240 would serve less Hanford related traffic than the freeway scenario, it did accommodate a greater number of trips utilizing the Bypass Highway for short distances.

SCENARIO 4 - WIDEN SR240/STEVENS DRIVE TO SIX LANES

ROADWAY DEFICIENCIES/FIGURE 2-9



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SR 240 METROPOLITAN TRANSPORTATION STUDY

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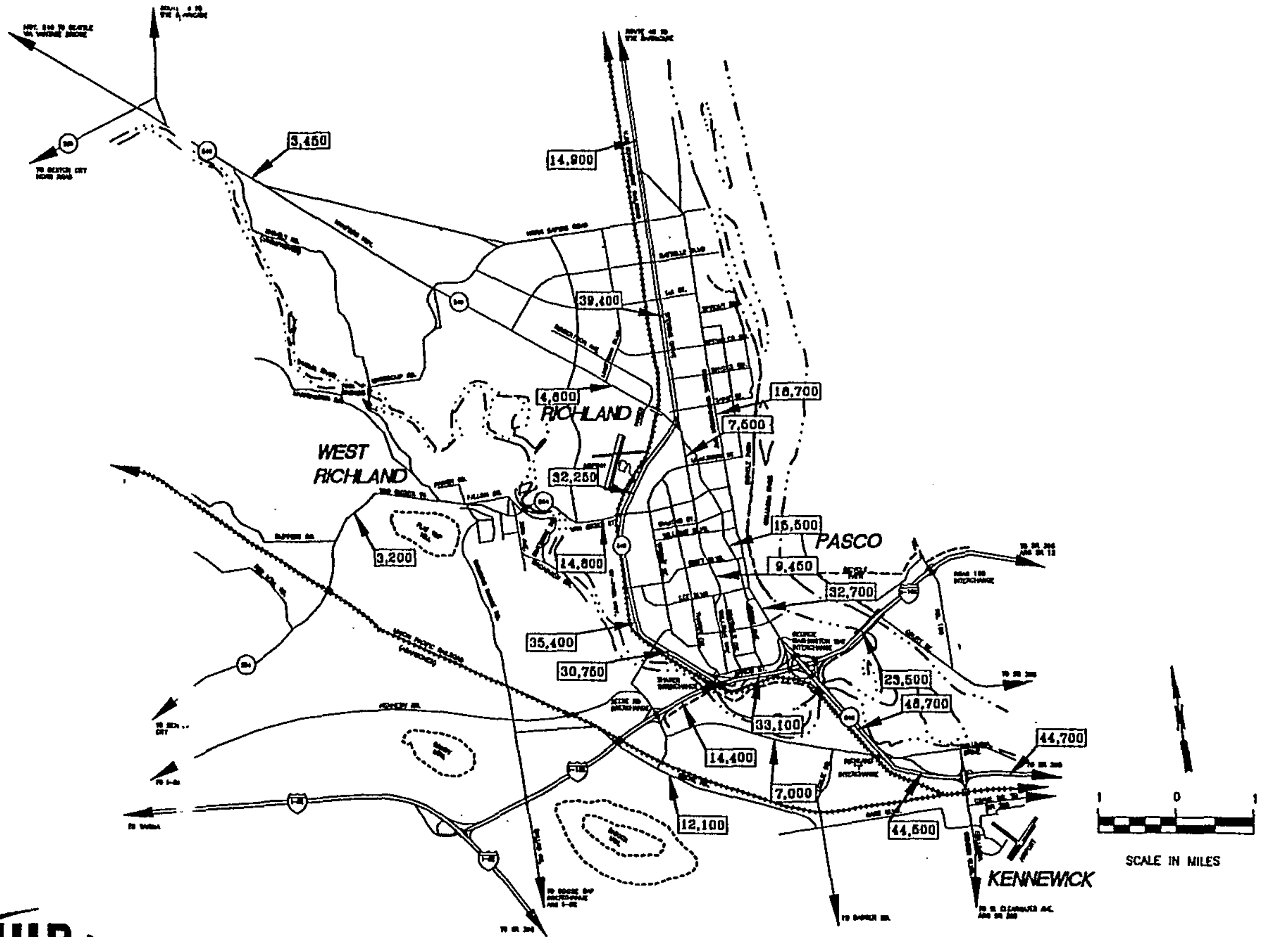
SCENARIO 4 - WIDEN SR240/STEVENS DRIVE TO SIX LANES

PROJECTED DAILY TRAFFIC/FIGURE 2-10



SCENARIO 5 - WEST RICHLAND ROUTE

Constructing a new route through West Richland represents a different approach to reducing SR 240 Corridor congestion. Rather than to widen SR 240/Stevens or another route in the immediate corridor, a separate facility was coded in the model to assess whether it would attract sufficient volumes to lessen congestion on existing and planned streets.

This scenario includes constructing a new arterial facility to extend from Horn Rapids Road to the Twin Bridges over the Yakima River and around Flat Top Hill to intersect with the Bombing Range Road Alignment. The typical cross section for this roadway is a super-two type facility, including two through lanes, turn lanes, and acceleration and deceleration lanes as appropriate.

Remaining congested links and nodes following scenario improvements are shown in Figure 2-11. The new route did attract some SR 240/Stevens traffic volumes. However, sections of the SR 240 Bypass remained congested. Roadway segments congested during the peak hour include segments of:

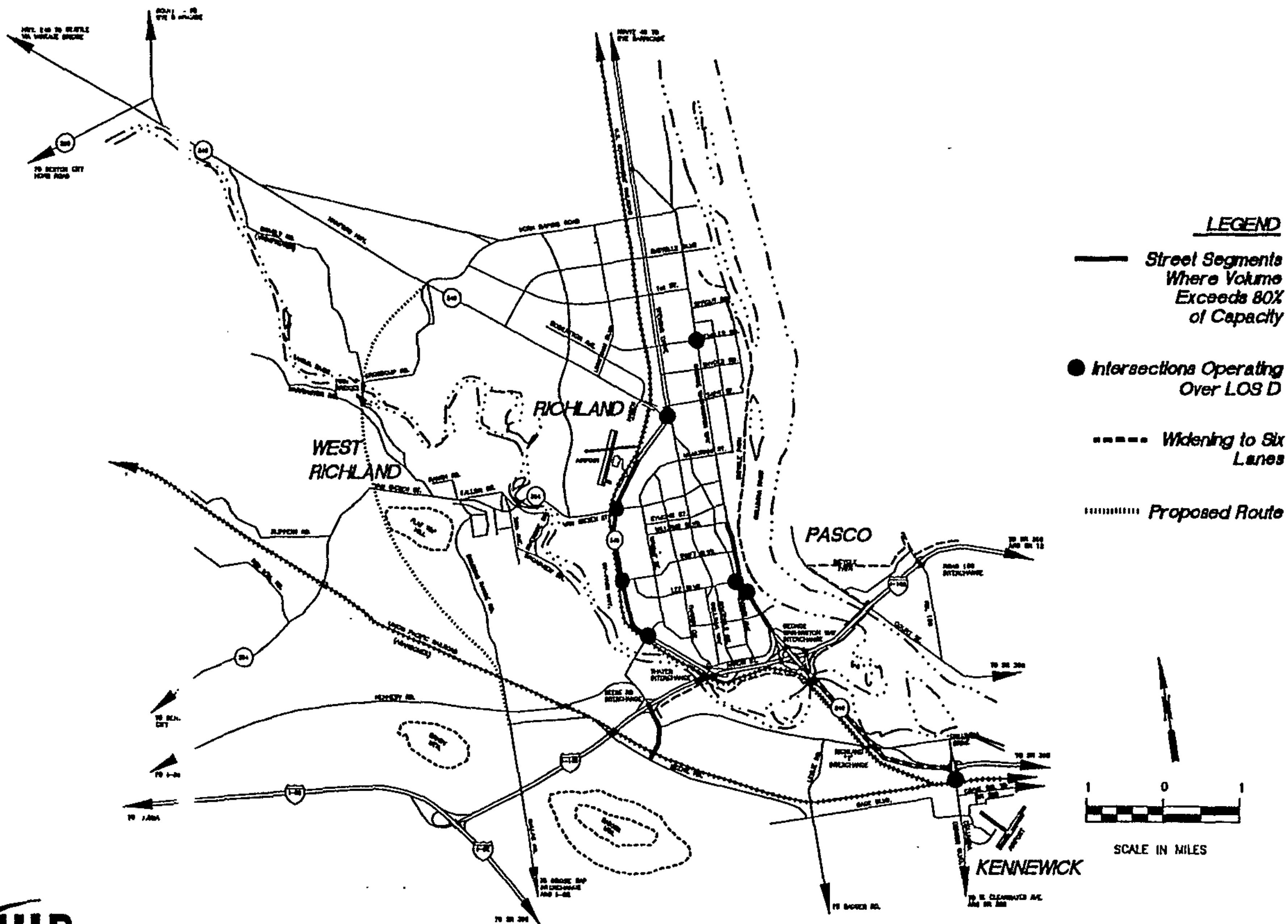
- SR 240 Bypass;
- George Washington Way; and
- Kennedy Road (south of I-182).

Intersections which operated at LOS E or F include:

- SR 240/Bypass Highway;
- SR 240 Bypass/Van Giesen;
- George Washington Way/Spengler;
- George Washington Way/Jadwin;
- Jadwin/Lee:
- SR 240 Bypass/Swift (if signalized);
- SR 240 Bypass/Duportail (if signalized); and
- Columbia Center/SR 240 south ramps.

SCENARIO 5 - WEST RICHLAND ROUTE

ROADWAY DEFICIENCES/FIGURE 2-11



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SR 240 METROPOLITAN TRANSPORTATION STUDY

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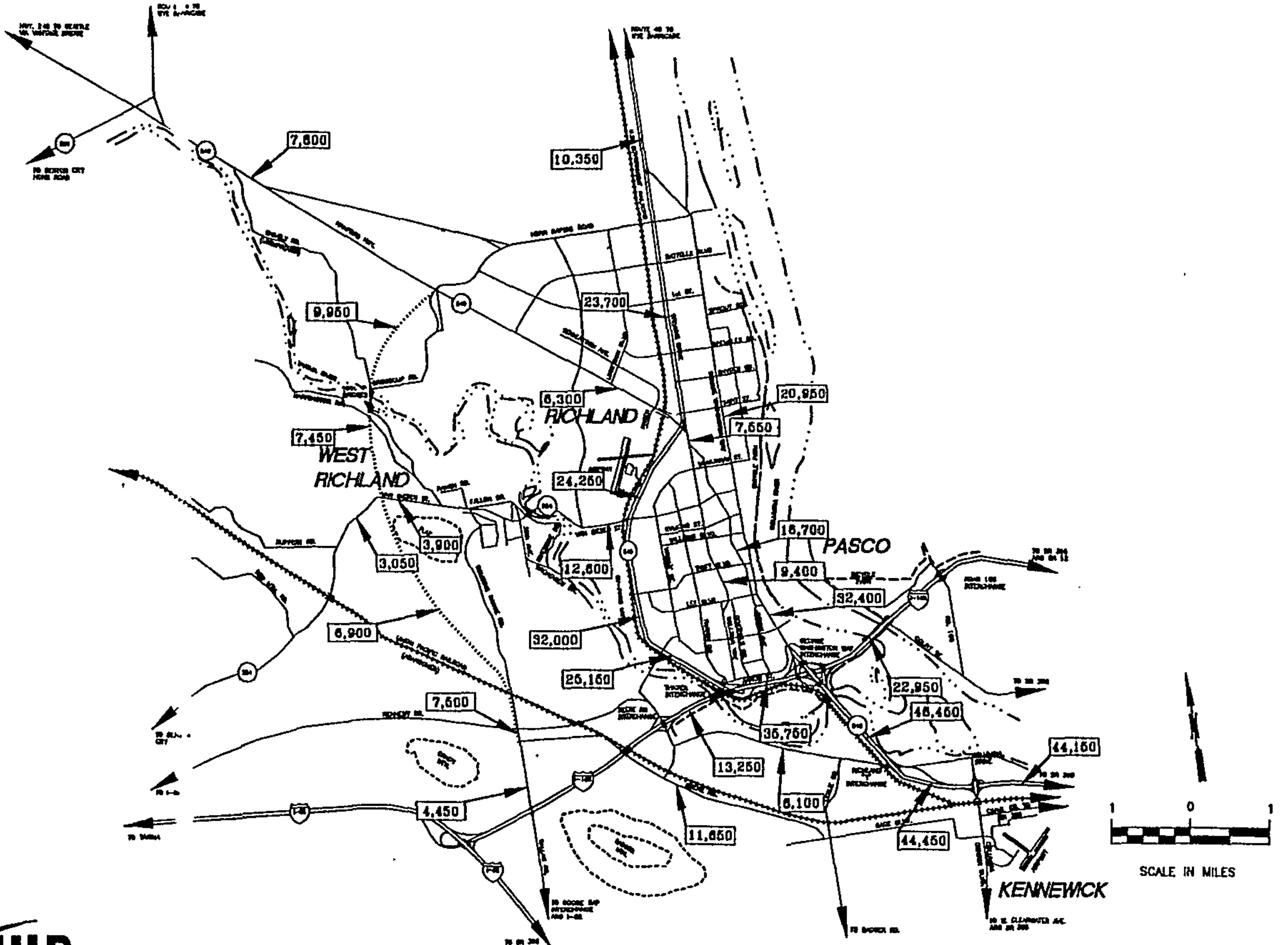
Year 2012 daily traffic forecasts are shown in Figure 2-12. The new West Richland route would carry nearly 10,000 vehicles between SR 240 and the Twin Bridges; 7,450 between the Twin Bridges and SR 224; and 6,900 between SR 224 and Bombing Range Road. Heavy traffic routes in the scenario included Stevens Drive/SR 240, George Washington Way and SR 240, south of I-182. The heavy volumes on SR 240 between I-182 and Columbia Center Boulevard would justify six lanes along this stretch.

SCENARIO 5 - WEST RICHLAND ROUTE

PROJECTED DAILY TRAFFIC/FIGURE 2-12



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SR 240 METROPOLITAN TRANSPORTATION STUDY

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SCENARIO 6 - HORN RAPIDS TOLL BRIDGE

Like Scenario 5, this scenario represents an attempt to solve SR 240 Corridor problems by construction of a new route outside the corridor itself. This scenario would reduce the distance between Hanford, the City of Pasco and the West Pasco area. It would also provide an alternate route for freight and hazardous material shipments from US 395 to Hanford.

This scenario includes adding a toll bridge facility across the Columbia River connecting Horn Rapids Road to Road 68 and further to US 395. Road 68 would provide access to I-182 as it currently does.

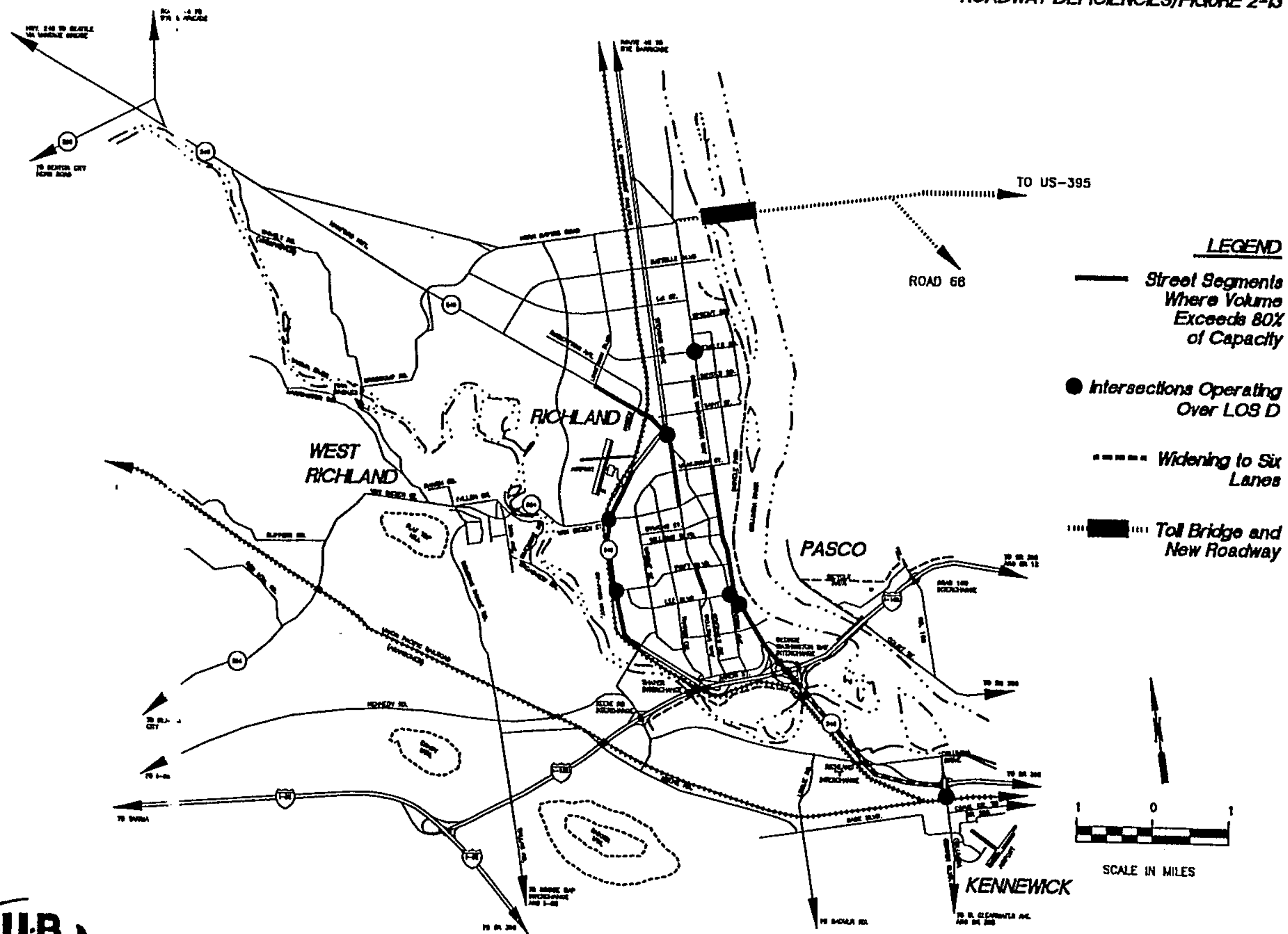
This route was initially studied in 1980 as a toll bridge. The study concluded that a toll of $3-$4 would be required to make the project feasible in terms of cost. When a toll of this magnitude was added to the traffic simulation model, the proposed route attracted very low volumes (approximately 1,000 ADT). Through network model testing, it appears that the maximum charge which should be considered is $2. At this rate, it achieved the results which are presented in Figure 2-14. At a toll of $.50 or less, the route would attract significantly more traffic use (12,000 - 13,000 ADT).

Remaining congested links and nodes following scenario improvement are shown in Figure 2-13. The new toll route did not reduce projected traffic congestion on any major route. Roadway segments congested included segments of:

- SR 240 Bypass;
- Stevens Drive; and
- George Washington Way.

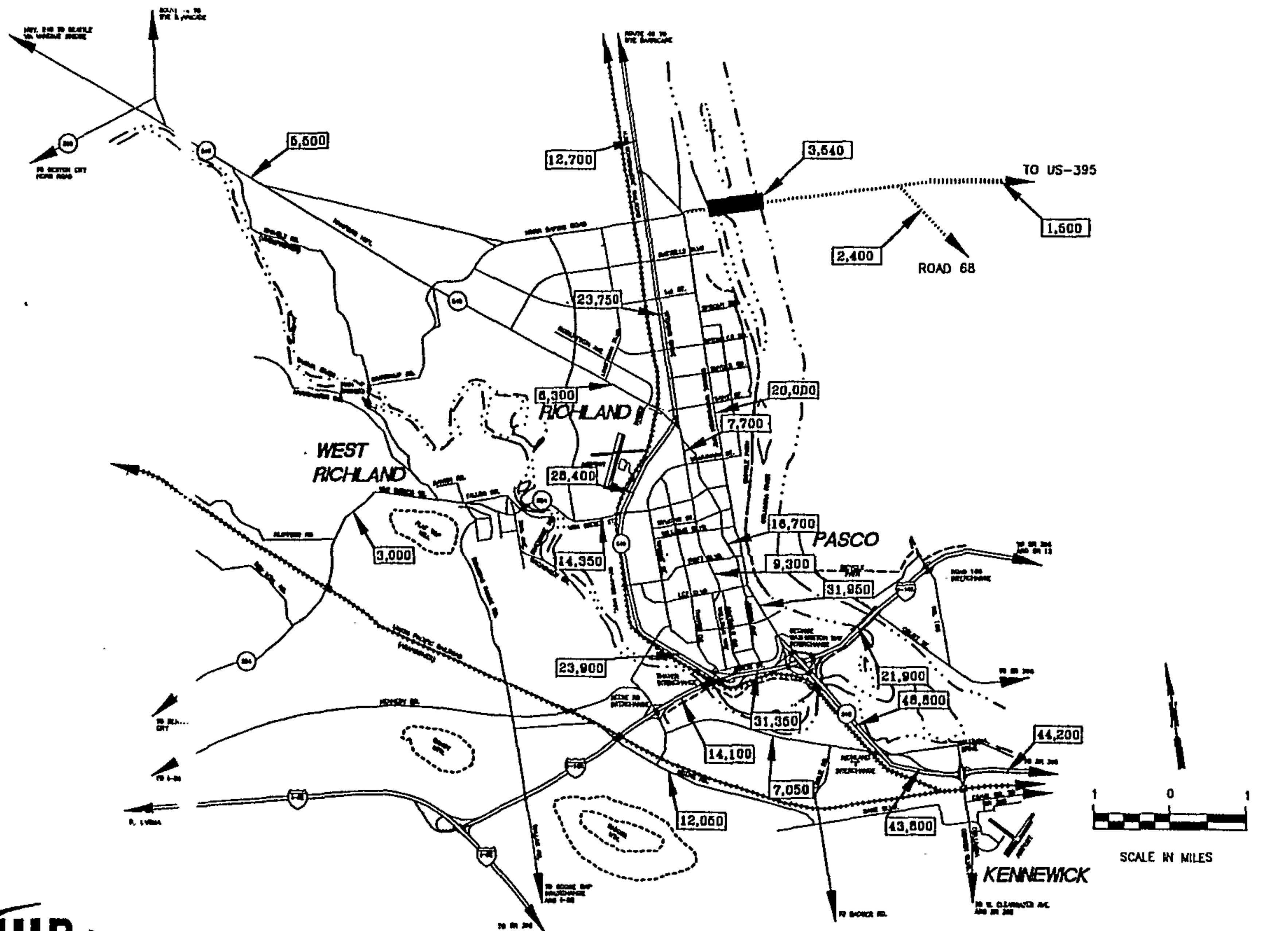
SCENARIO 6 - HORN RAPIDS TOLL BRIDGE

ROADWAY DEFICIENCES/FIGURE 2-13



SCENARIO 6 - HORN RAPIDS TOLL BRIDGE

PROJECTED DAILY TRAFFIC/FIGURE 2-14



Intersections which operated at LOS E or F include:

- SR 240/Bypass Highway;
- SR 240 Bypass/Van Giesen;
- SR 240 Bypass/Swift;
- George Washington Way/Spengler;
- George Washington Way/Jadwin;
- Jadwin/Lee; and
- Columbia Center Boulevard/SR 240 south ramps.

Year 2012 daily traffic forecasts are shown in Figure 2-14. The $2.00 toll route would attract 3,540 daily trips. Traffic volumes would be relatively high on SR 240 between I-182 and Columbia Center Boulevard thus requiring six lanes.

SCENARIO 7 - TRANSPORTATION DEMAND MANAGEMENT

This scenario represents an attempt to resolve future congestion through the encouragement of and assumed positive response to Transportation Demand Management (TDM) strategies. This scenario models implementation of the trip reduction goals of Washington State's Commute Trip Reduction Law discussed earlier in this section of the report. This alternative scenario also includes the TIP projects.

Remaining congested links and nodes following scenario improvement are shown in Figure 2-15. Congested roadway segments include:

- SR 240 Bypass Highway;
- SR 240 (I-182 to Columbia Center Blvd.); and
- George Washington Way.

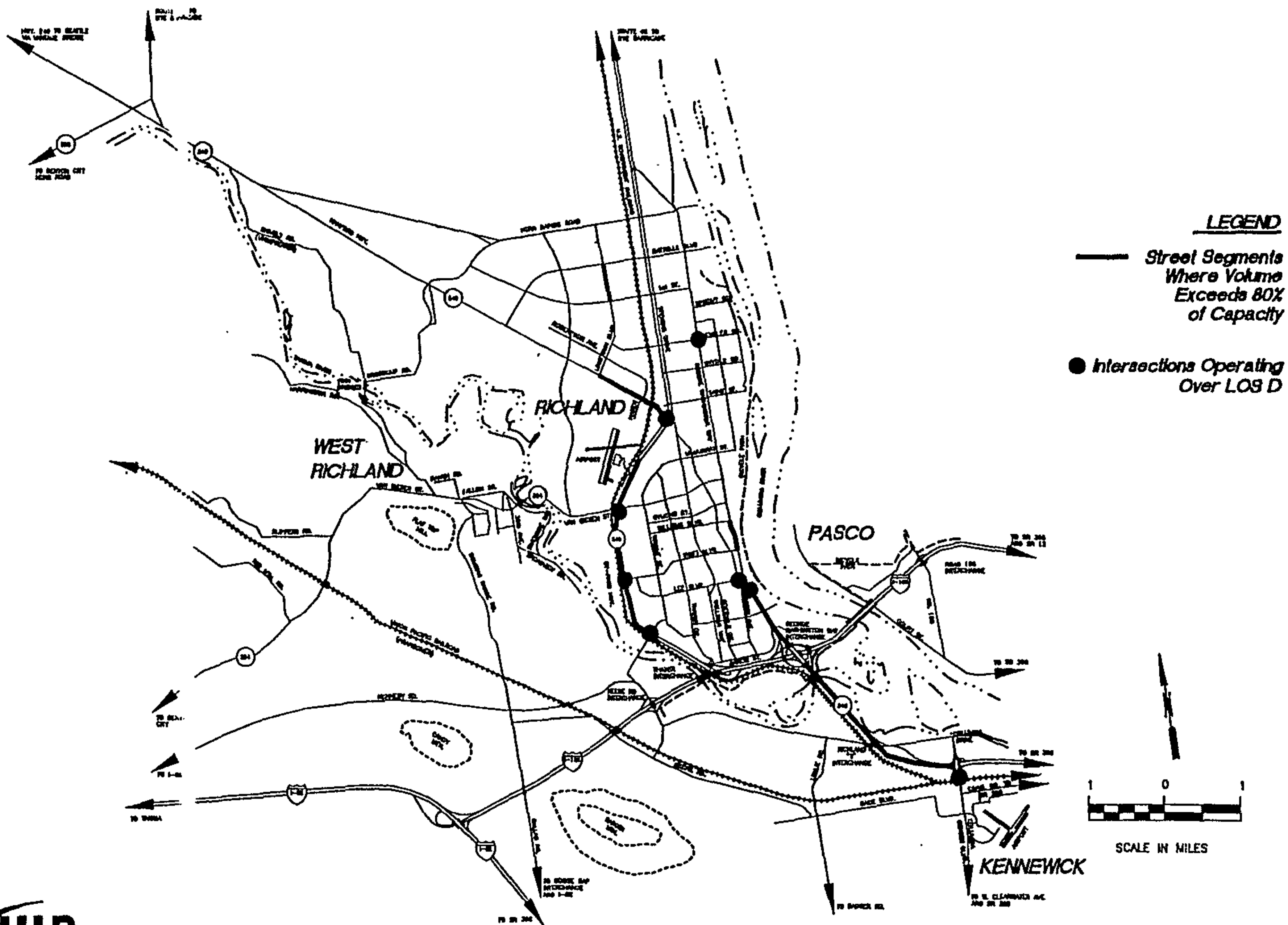
Intersections which operated at LOS E or F include:

- SR 240/Bypass Highway;
- SR 240 Bypass/Van Giesen;
- George Washington Way/Spengler;
- George Washington Way/Jadwin;
- Jadwin/Lee;
- Columbia Center Boulevard/SR 240 south ramps;
- SR 240/Swift (if signalized); and
- SR 240/Duportail (if signalized).

Year 2012 daily traffic forecasts are shown in Figure 2-16. TDM tended to reduce traffic volumes slightly throughout the network, but the impact was not great enough to resolve projected traffic congestion problems. There was noticeable improvement, however, to the segment of Stevens Drive between McMurray and Lee.

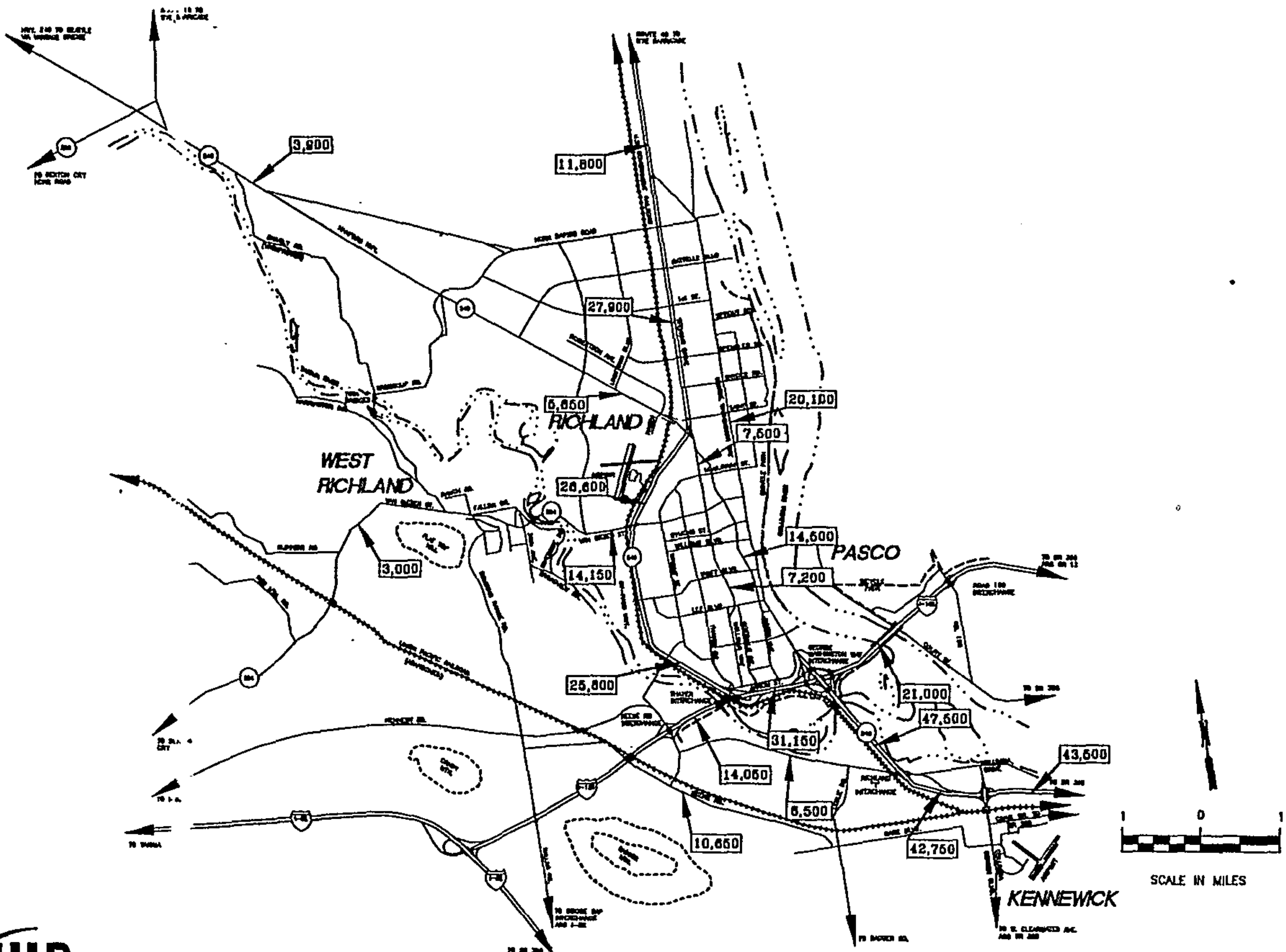
SCENARIO 7 - TRANSPORTATION DEMAND MANAGEMENT

ROADWAY DEFICIENCIES/FIGURE 2-15



SCENARIO 7 - TRANSPORTATION DEMAND MANAGEMENT

DAILY PROJECTED TRAFFIC/FIGURE 2-16



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SR 240 METROPOLITAN TRANSPORTATION STUDY

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SCENARIO COMPARISON

A series of performance measures were defined to compare the system-wide impacts of the scenarios. The performance measures are for the p.m. peak hour and include:

- Vehicle miles traveled (VMT), the number of miles all vehicles travel on Tri-City street network;
- Vehicle hours traveled (VHT), the number of hours vehicles spend traveling on the Tri-City street network;
- Number of trips, the number of trips taken on the network;
- System operating speed;
- System volume-to-capacity ratio (V/C), an average of volume-capacity ratio for all the links in the network;
- Lane miles, the number of lanes multiplied by centerline miles; and
- Lane miles where the volume-capacity ratio was greater than 0.80.

The performance measures provide a sense of scale between the alternatives. The number of trips, VMT and VHT are measures that are closely tied to environmental and growth management concerns. Operating speed, volume capacity ratio and lane miles over 0.80 indicate the level of congestion in the network. The performance indicators are summarized in Table 2-6.

The results summarized in the table indicate the level of growth in VMT, VHT and trips between the Base Model and the 20 year scenarios. The results also indicate that future traffic growth will reduce system operating speed and increase the system volume-capacity ratios in the next twenty years.

TABLE 2-6
SR 240 NETWORK COMPARISON OF SCENARIOS
P.M. PEAK HOUR

Scenario	VMT	VHT	Trips	Operat. Speed (MPH)	System V/C	Lane Miles	Lane Miles > 0.80	Fuel Consumption per day (GL)
Base Model (Existing)	323,013	7,823	42,829	35.1	0.19	1,058	12	185,582
#1 Base/20 Year	428,075	13,361	57,735	32.9	0.27	1,058	57	252,028
#2 E-TIP/20 Year	427,458	12,931	57,735	33.8	0.26	1,096	44	249,084
#3 Interchanges	427,058	12,548	57,735	34.1	0.25	1,110	42	248,022
#4 Widen SR 240/Stevens	426,054	11,924	57,735	34.1	0.25	1,102	36	247,439
#5 West Richland Route	426,515	11,168	57,735	34.3	0.25	1,107	42	247,162
#6 Horn Rapids Route	402,589	12,007	57,735	34.1	0.25	1,043	40	233,811
#7 Demand Management	408,324	10,857	55,974	34.0	0.25	1,096	37	237,404

All of the twenty year scenarios had similar system level values. All of the build scenarios indicated improvement over the future no-build and future existing plus TIP networks. VMT was lowest in the Demand Management Scenario. The construction of interchanges to produce a four-lane freeway on SR 240 increased the amount of travel on that roadway to the point where it was congested. These results suggest that a six-lane freeway section may be needed to reduce congestion further. Additionally, the Toll Bridge Scenario had the lowest VMT due to the availability of a new more direct route for many of the trips.

A summary of intersection level-of-service for all scenarios is presented in Table 2-7.

TABLE 2-7
INTERSECTION LEVEL-OF-SERVICE

LOCATION	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6		Scenario 7	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
SR 240/Bypass Hwy	F	>120	F	101	C(W)	19.3	E	56.7	F	61.9	F	83.5	F	56.2
					B(E)	7.7								
SR 240/Van Giesen	F	119	E	64.8	B(W)	13.1	D	37.6	E	52.3	F	64.1	F	70.1
					B(E)	10.3								
SR 240/I-182	F	>120	D	29.1	-	-	C	17.5	C	20.4	C	19.7	C	15.8
GWW/Saint	F	>120	F	78.1	E	48.1	D	30.4	C	20.3	D	37.8	D	30.9
GWW/Spengler	F	>120	F	>120	E	45.1	F	60.3	F	114	F	114	F	88.9
GWW/McMurray	B	13.5	B	7.5	B	5.1	B	6.1	B	6.8	B	6.9	B	6.2
GWW/Van Giesen	B	11.4	B	8.3	B	5.7	B	5.7	B	6.7	B	6.1	B	5.5
GWW/Swift	D	27.9	D	25.6	B	11.7	D	26.0	C	24.3	C	22.4	B	14.9
GWW/Lee	F	67.1	E	42.4	C	16.3	D	39.9	D	37.9	D	34.1	C	22.4
GWW/Jadwin	F	>120	F	>120	D	38.4	F	90.7	F	118	F	80.1	F	84.8
Jadwin/Williams	C	23.1	C	21.5	C	15.6	C	17.3	C	18.9	C	22.4	C	18.1
Jadwin/Lee	F	>120	F	>120	F	>120	F	>120	F	>120	F	>120	F	>120
Columbia Ctr/SR 240N	B	10.1	B	8	B	8.1	B	8.0	B	7.9	B	8.0	B	7.1
Columbia Ctr/SR 240S	F	>120	F	73	F	67.8	F	71.9	F	70	F	68.2	F	71.1
SR 240/Swift			D*	-	-	-	E*	41.9	E	55.7	E	54.7	F	64.8
SR 240/Duportail			F*	-	-	-	E*	58.8	E	56.2	D	30.1	F	69.2

* stop sign control - delay on side streets and main street left-turns

OTHER TRANSPORTATION MODES

Rail

The existence of a heavy rail line through the Hanford property could give the appearance that a shuttle rail system might be feasible for Hanford employees. Although developing capture rates and examining the feasibility of utilizing this existing facility were outside the scope of this study, a review of past studies regarding this issue was conducted. Information received from Hanford sources indicated that should the use of the existing rail line be considered for a shuttle, significant maintenance and upgrade would need to be done on the tracks and ballast. Given that a significant amount of ridership would be required to warrant the repairs and keep the service operating within fiscal limits, this mode does not appear to be viable.

Non-motorized Strategies

Nonmotorized transportation represents three specific types of user groups for the purpose of this study. These are pedestrians, bicyclists, and equestrians. Each group has different characteristics of concern to the SR 240 corridor, yet they all share one common characteristic in that they rely upon the transportation system to provide safe access.

The predominance of relatively short work trips in the SR 240 corridor limits the impact of effective ridesharing programs, but the short distance commuter can also be encouraged not to drive alone to work. Bicycling and walking attract a relatively small but dedicated group of commuters. There is evidence that this group is increasing in size and is becoming a legitimate commuting alternative. According to the Worldwatch Institute, the production of bicycles worldwide has quadrupled since 1969 while automobile production has shown only a modest increase in production in the same time period.

In addition to the increasing size of non-motorized users, a survey performed by Bicycling Magazine in 1991 revealed the following:

- If there were safer lanes on roads and highways, 20 percent of American adults would sometimes commute to work by bicycle;

- If their employers offered a financial incentive for bicycle commuting, 18 percent of American adults would occasionally commute to work by bicycle;

- If secure storage and showers were made available, 17 percent of American adults would sometimes commute to work by bicycle; and

- If fuel prices reached $2.00 a gallon, one in four Americans would use their bicycles for some trips they make by car.

Non-motorized modes can be encouraged by physical amenities provided in the street system or at the work place. Safe, clearly delineated, and well maintained bike routes are a major incentive for bicycling commuting. Bike parking and shower/locker facilities at the work place are frequently requested by bicyclists or would-be bicyclists. Walking has a more restricted commuter market than bicycling, as it is most practical for commutes of one mile or less. Walking should be encouraged as an alternate mode to help break the "auto-dependency" frame of mind that has come to exemplify travel behavior.

While bicycling may not be for everyone, the climate and relatively flat terrain in the study area are major inducements. A map showing existing and planned facilities was provided in Section One of this study. Most of this information was obtained from the City of Richland and the Regional Bikeway Plan. Public testimony was given by the local bicycle club on how to improve the bicycle system. Their comments are presented in Appendix C.

SECTION 3

IMPLEMENTATION COSTS & FUNDING

Cost Estimates

This study has examined seven different future year scenarios and identified five potential alternatives to relieve the congested areas of the SR 240 Corridor. Each scenario has been tested utilizing the transportation model with the potential results previously discussed.

For the purpose of providing additional evaluation criteria for the local officials, the estimated costs for each scenario are provided below in Table 3-1. Detailed descriptions of each scenario were provided in Section 2.

TABLE 3-1
ESTIMATED IMPROVEMENT COSTS

Scenario/Project	Estimated Cost
#2 TIP Projects (Reference Page 58 and Table 2-5)	$40,000,000
#3 Horn Rapids Interchange	$2,400,000
#3 1st Street Interchange	$2,600,000
#3 Stevens/Jadwin/Bypass Interchange	$3,500,000
#3 Van Giesen Interchange	$7,300,000
#3 Duportail Interchange	$2,600,000
#3 Frontage Road - Horn Rapids to Saint	$3,600,000
#4 Widen Stevens Drive, SR 240 Bypass, SR 240	$19,200,000
#5 West Richland Route (2 lane facility)	$8,800,000
#6 Horn Rapids Bridge & Extension to I-182 (4 lane facility)	$51,500,000
#3,5,6 Widen SR 240 (I-182 to Columbia Center Blvd.)	$10,000,000
#7 Transportation Demand Management	See Discussion

The Transportation Demand Management alternative reviewed in this study assumed that the implementation of an aggressive TDM program would be the responsibility of major employers in the study area. Most of the TDM components outlined in Section 2 would result in the investment of private funds. However, it is not prudent to assume that some public improvements would not be needed to assure the success of the TDM program such as new buses, additional bus stops, park and ride facilities, and perhaps the administration of monitoring the various programs.

The success of TDM will rely on a strong and positive public/private relationship. Initially, however, the major employers in the area could implement several low-cost strategies which have potential for yielding results such as flex schedules and incentive programs to encourage employees to change their commute behavior.

There are many areas of the country where Transportation Management Organizations (TMO) have been successful in helping employers develop and implement effective TDM programs. The TMO is generally any organization, entity or association which is comprised of two or more employers and performs or assists its member employers in performing some or all of the TDM requirements.

Typically, the TMO will operate without the expenditure of public funds. Thus, for the purposes of this report, it is assumed that minimal, if any, public funding would be required to implement a TDM program.

Funding

This section identifies funding mechanisms and types of debt available for transportation improvements. These mechanisms include new sources provided through state legislation in conjunction with the State Growth Management Program. The State provides for the imposition of impact fees, additional real estate excise taxes, local option taxes (fuel, tax, vehicle license fee, commercial parking, and street utility), and High Occupancy Vehicle (HOV) local option taxes.

Dedicated Governmental Funds for Street Purposes:

State Shared: A portion of a motor vehicle fuel tax is distributed to cities and counties for "highway purposes". Local option fuel taxes, equivalent to 10% of the state tax may also be levied by counties, also for highway purposes.

County Road Tax: Property tax for road purposes, 2.25/$1000 assessed value, only in unincorporated areas.

Local Vehicle License Fee: Authorized and collected by county (subject to referendum), shared with cities.

Street Utility: City only, charge of $2 per month per household or per employee. Cannot exceed 50 percent of total street maintenance costs. Some HCT or HOV charges must be deducted from the employee charge; state employees are exempted.

Commercial Parking Tax: County or city, subject to referendum, imposed on commercial parking businesses. For general transportation purposes.

Federal Forest Yield Tax: Distributions of revenues from timber operations on federal-owned lands to counties. Federal Forest Reserve Funds have been an important source of funding to counties for several years. Counties use these revenues to fund both schools and roads.

Other Dedicated Governmental Funds for Transportation Purposes:

Transportation Benefit Districts: Special taxing districts for transportation proposes created by cities and/or counties. Allows more than one jurisdiction to join together for the purpose of acquiring, constructing, improving, providing, and funding any city street, county road, or state highway improvement within the district. With voter approval, has authority to levy property tax and issue general obligation bonds. With city/county approval, has authority to impose fees on building construction or land development.

Transit Tax: Separate taxing authority for transit authorities. Voter approval is required for the B&O, household/utility, and sales and use taxes.

Federal Financial Assistance

ISTEA: The intermodal Transportation Efficiency Act (ISTEA) of 1991 changed the way federal funds are allocated to transportation projects. ISTEA provides unprecedented flexibility in funding. Federal funds can now be allocated more easily to the various modes of transportation including highways, transit, pedestrian facilities, bicycle facilities and other project types. The old classification systems such as federal-aid primary and federal-aid urban have been replaced with the National Highway System and a locally defined arterial street system.

The Surface Transportation Program is providing $2.3 billion for funding transportation projects through 1997. Ten percent of the money is set aside for enhancements. Another ten percent is provided for safety projects.

The Washington State Department of Transportation developed a mechanism to allocate STP funds to each urban area. This regional allocation is distributed on a formula basis.

For regional competition, funds are distributed to:

- Transportation Management Areas (TMAs) for areas with an urban population over 200,000.
- Metropolitan Planning Organizations (MPOs) for areas with an urban population over 50,000.
- Counties/Regional Transportation Planning Organization (RTPOs) for areas with an urban population under 50,000. There will be county-wide competition through the Federal Fiscal Year (FFT) 1995. Competition would be at the RTPO level thereafter.

FTA Urban Mass Transit, (Section 3,9): To transit agencies from the federal government. Section 3 is for new rail projects, improvement of existing rail systems, and the rehabilitation of bus systems. Section 9 provides transit capital and operating assistance to urbanized areas.

FTA Urban Mass Transit, (Section 16): To provide, nonprofit agencies from the federal government through the state. Provides capital assistance for transportation services to elderly persons and persons with disabilities.

FTA Urban Mass Transit, (Section 18): To transit agencies, cities and counties in rural areas from the federal government through the state. Provides transit capital and operating assistance to nonurbanized areas.

Community Development Block Grant (CDBG): Federal funds available to cities and counties for a variety of public facilities (and housing and economic development projects which benefit low to moderate income households).

Land and Water Conservation Fund (LWCF): Available to cities, counties, and the state to provide funds for trail development. Project must create or expand trail development.

State Financial Assistance

Urban Arterial Trust Account (UATA): Available to cities and urban counties from the state to projects that alleviate/prevent traffic congestion.

Transportation Improvement Account (TIA): Available to cities, urban counties and transportation benefit districts (TBDs) from the state for projects that alleviate/prevent traffic congestion.

Rural Arterial Program (RAP): Available to counties from the state for improvements to rural arterials.

These transportation funding mechanisms require that the city or county interested in using the mechanism comply with the transportation planning requirements of the State Growth Management Program, including the finance element.

City/County Funds

City/county revenue resources can be categorized as unrestricted and dedicated. Unrestricted revenue is available for transportation to the extent that transportation needs can compete with the many other local government needs.

Unrestricted Governmental Funds:

General Funds: General funds include all local funds subject to appropriation by the governing body--property taxes, local option sales taxes, utility taxes, general state shared revenues, business license fees, etc. These funds may be used for transportation purposes.

Special Property Taxes: Additional taxes can be authorized by voters, usually for the purpose of bonds. If proposal is above the statutory limitation for taxing rate, it must be approved by 60 percent of voters with 40 percent turnout. If it is below the legal limitation, a simple majority is sufficient (usually called a "lid lift"). The tax may be temporary or permanent.

Dedicated Governmental Funds for Capital Purposes:

Real Estate Excise: Tax on sale of real property. Two categories are available; now both can be used for all types of GMA defined capital projects, not just streets. The projects must be included in the capital facilities element of the comprehensive plan.

County Arterial Preservation Program (CAPP): Available to counties from the state to preserve paved county arterials.

Community Economic Revitalization Board (CERB): Available to cities, counties, port districts, and special purpose districts from the state in the form of low interest loans and occasional grants to finance sewer, water, access roads, or bridges for a specific private sector development.

Public Works Trust Funds (PWTF): Available to cities, counties, and special purpose districts from the state in the form of low interest loans for public work improvements.

Motor Vehicle Excise (MVET) for Transit and High Occupancy Vehicle Lanes: With voter approval, transit agencies may collect a local excise tax on vehicles registered within their taxing district, imposed in addition to the state MVET, for high capacity transit service. Certain large population counties may with voter approval, collect a local excise tax on vehicles registered within their county, imposed as an addition to the State MVET, for high occupancy vehicle lanes and related facilities.

Local Development Matching Fund (LDMF): Available to cities to fund transportation studies related to economic development.

Essential Rail Assistance Account (ERRA): Available to cities, county rail districts, and port districts; provided to preserve essential freight rail service on economically viable light density lines. Rail lines must appear in the State Freight Rail Plan.

Essential Rail Banking Account (ERBA): Available to cities, county rail districts, and port districts. Preserve freight rail corridors. The rail lines must appear in the State Freight Rail Plan.

Private Sources

User Fees

Transit Fares: Established by transit operator.

Tolls: Paid by user: limited to repayment of bonds to finance construction.

Ferry Fares: Established by ferry operator.

Parking Fees: Either for use of right-of-way (on street parking) or special facility (parking garage).

Developer Contributions

Development Regulations: Various development regulations (especially subdivision ordinances) may require that certain facilities to be available, frequently requiring developers to finance them.

Special Assessments: Local Improvement or Road Improvement Districts may be formed to finance street improvements through a special assessment on benefitted property.

Industrial Revenue Bonds: IRBs are special debt instruments under the IRS code allowing tax free interest. Bonds are retired by revenue generated from the benefitted property. Can be used for streets. This power is limited by requirements in the IRS code.

NEPA/SEPA Mitigation: Public facilities, including streets, traffic signals, or additional lanes may be required in order to mitigate adverse environmental impacts from development. As part of the development approval process the municipality can require that the developer mitigate the impacts on the public facilities caused by the development. The two parties may agree to negotiate an agreement that determines the appropriate share of the funding, and establishes the developer's methods of payment for mitigation of direct impacts. A developer may agree to pay a monetary fee or to mitigate through donation of a right-of-way or completed facilities. Negotiated agreements are entered into voluntarily and are enforceable by the municipality.

Impact Fees: System of fees authorized under the Growth Management Act to finance public facilities. Generally imposed as a condition for approval to proceed with development to ensure adequate capital facilities are built. The fees must follow an established procedure and criteria that guard against duplication of fees for the same impact. The fees are only for system improvements that are "reasonably" related to the development and they are set to reflect the proportionate share of the system improvement costs directly impacted by the development.

Voluntary Contributions: Voluntary contributions can be made by the developer to facilitate their development. Contributions can be in the form of money, but often are in the form of donated right of way or even a completed facility. Contributions are subject to the same stipulations as a negotiated agreement, however they are not enforceable by law.

Operating/True/Financing Leases: A form of "privatization". Developer builds a facility, leases to government for a charge to recover cost and profit.

Debt Types

Many of the various sources of revenue can be used to fund the facility at one time through various debt financing systems.

Voted General Obligations (GO): Debt secured by "full faith and credit" of the jurisdiction: taxing power pledged to repay debt. Usually (not always) involves approval of an additional property tax levy pledged to retire the debt. Requires a vote with a 60 percent approval of those voting at an election with the participation of 40 percent of the number who voted in the last general election in the jurisdiction. Total amount of debt is limited by statute and constitution.

Nonvoted General Obligations (GO): This debt is also secured by "full faith and credit" of the jurisdiction. However, no voter approval is required and debt service is paid out of current taxing authority (revenue is diverted from operations and is committed debt service). Sometimes this type of debt may be coupled by a "Levy Lift" vote if additional taxing authority is available in the jurisdiction. Total amount of this type of debt is strictly limited by law. Also called "councilmanic" debt or an "inside levy".

Revenue Bonds: Debt is secured by identified revenue source, not the taxing power of the jurisdiction. Such revenue is usually some sort of user fees, such as fare box revenues or toll charges. Since such revenues are less secure than taxing powers, this type of dept usually has higher interest costs than GO bonds. Rarely used for street financing, but theoretically possible. Street utilities could increase the use of this type of debt. Industrial revenue bonds are technically a specialized type of revenue bonds.

Double Barrelled Bonds: Debt secured by taxing authority (under one of two types of GO methods), but debt service is paid out of other revenues. This allows revenue bonds to enjoy lower interest benefits of GO bonds.

Special Assessment Debt: Bonds financed by the formation of a special assessment district (Local Improvement District, Road Improvement District, or Utility Local Improvement District). Predominate method of debt financing of developer contributions. Must be based on benefit to the assessed properties and must meet requirements of IRS code. Can be augmented by general revenues (usually by absorbing financing costs or "buying town" interest rates).

SECTION 4

EVALUATION AND RECOMMENDATION

Evaluation of the various scenarios serves three purposes in the transportation planning process. First, it determines the value of the individual scenarios and the desirability of one over another. Second, evaluation provides information to decision makers on the impacts of the project and program proposals, their trade-offs, and the major areas of uncertainty. Finally, evaluation provides planners and engineers with an opportunity to identify further areas of study.

For this study, seven scenarios were examined for future year traffic. Scenarios 1 and 2 were utilized to measure the impact of future traffic without any improvements to the SR 240 Corridor. The remaining five scenarios tested specific transportation improvements to address the deficiencies identified in the first two scenarios. The strengths and weaknesses of each alternative were evaluated based on the following categories:

- Safety: Measures the ability of the alternative to improve overall safety.

- Congestion Relief: Assesses the ability of the improvement to reduce congestion.

- Impacts on Environment: Assesses the potential for environmental impacts based on similar projects.

- Community Support: Based on response at public meetings, correspondence, and discussions.

- Cost: Identifies economic feasibility of the alternative.

- Vehicle Miles Travel: Assesses the ability of each alternative to reduce vehicle miles of travel throughout the corridor. Typically, reduction of VMT also produces the benefit of reducing auto emissions.

The scenarios were evaluated against each other for each of the above categories. Points were assigned to each scenario based on the Consultant's opinion of clearly the worst and clearly the best alternative in each category. The results of this evaluation process are shown in Table 4-1.

TABLE 4-1
EVALUATION MATRIX

Scenario/Project	Safety	Congestion Relief	Environmental Impacts	Community Support	Cost	VMT
#3 New Interchanges, Freeway Facility	2	2.5	3	2	2.5	4
#4 Widen SR 240/Stevens to six lanes	2	2	3	4	4	3
#5 West Richland Route	2	2.5	3	3	2.5	3
#6 Horn Rapids Bridge and Extension	2	4	4	3	5	1
#7 Transportation Demand Management	1	3.5	1	1	1	2

1 = Best
5 = Worst

During the course of the evaluation it was concluded by the Consultant that the proposed Horn Rapids Road/Stevens Drive Interchange and the 1st Street/Steven Drive Interchange were not required in the future year analysis for Scenario 3. This conclusion also eliminated the need for a frontage road to provide access to Stevens Drive. Therefore, these components were removed from Scenario 3 and are not considered in the evaluation matrix and subsequent recommendations.

It should also be noted that none of the alternatives provided congestion relief at the Columbia Center Boulevard Interchange. Other studies have concluded that the proposed new interchange at Edison Street would provide some congestion relief at this interchange.

Recommendations

Based on the evaluation matrix presented above, the best alternative which addresses the combined categories is Transportation Demand Management. Even though TDM ranks lower in terms of its ability to reduce congestion within the corridor, its low implementation cost together with its other positive aspects make it the alternative which carries the highest recommendation. An aggressive TDM program should be pursued in the near future.

The alternative which complements TDM best by addressing the traffic deficiencies is Scenario 3. The grade separated interchanges contained in this scenario provide congestion relief at the SR 240/SR 240 By-pass/Jadwin intersection as well as at Van Giesen and Duportail. The widening of SR 240 between I-182 and Columbia Center Boulevard is also a component of this alternative. These improvements also have the potential to have good community support. Another ideal quality of this alternative is that the interchanges and the widening would not need to be constructed at one time. The construction and funding of the three interchanges and widening could be accomplished in phases over several years. This alternative carries the second highest recommendation and should be implemented on the heals of an aggressive TDM program.

The next alternative which provides congestion relief with good community support is the West Richland Route contained in Scenario 5. Because of its ability to utilize the existing Twin Bridges over the Yakima River, environmental impacts may be minimal. This alternative also has the ability to be constructed in phases should funding become an issue. The West Richland Route should be viewed as a local project since it is not part of the state route system. This could provide some flexibility in obtaining funds for this project. This alternative carries the third highest recommendation.

The alternative which produced the best ability to reduce congestion along the corridor was widening SR 240, SR 240 By-pass, and Stevens Drive to six lanes. This alternative is contained in Scenario 4. However, the cost of this improvement and the questionable community support diminishes the desirability of this option. This alternative carries the lowest recommendation.

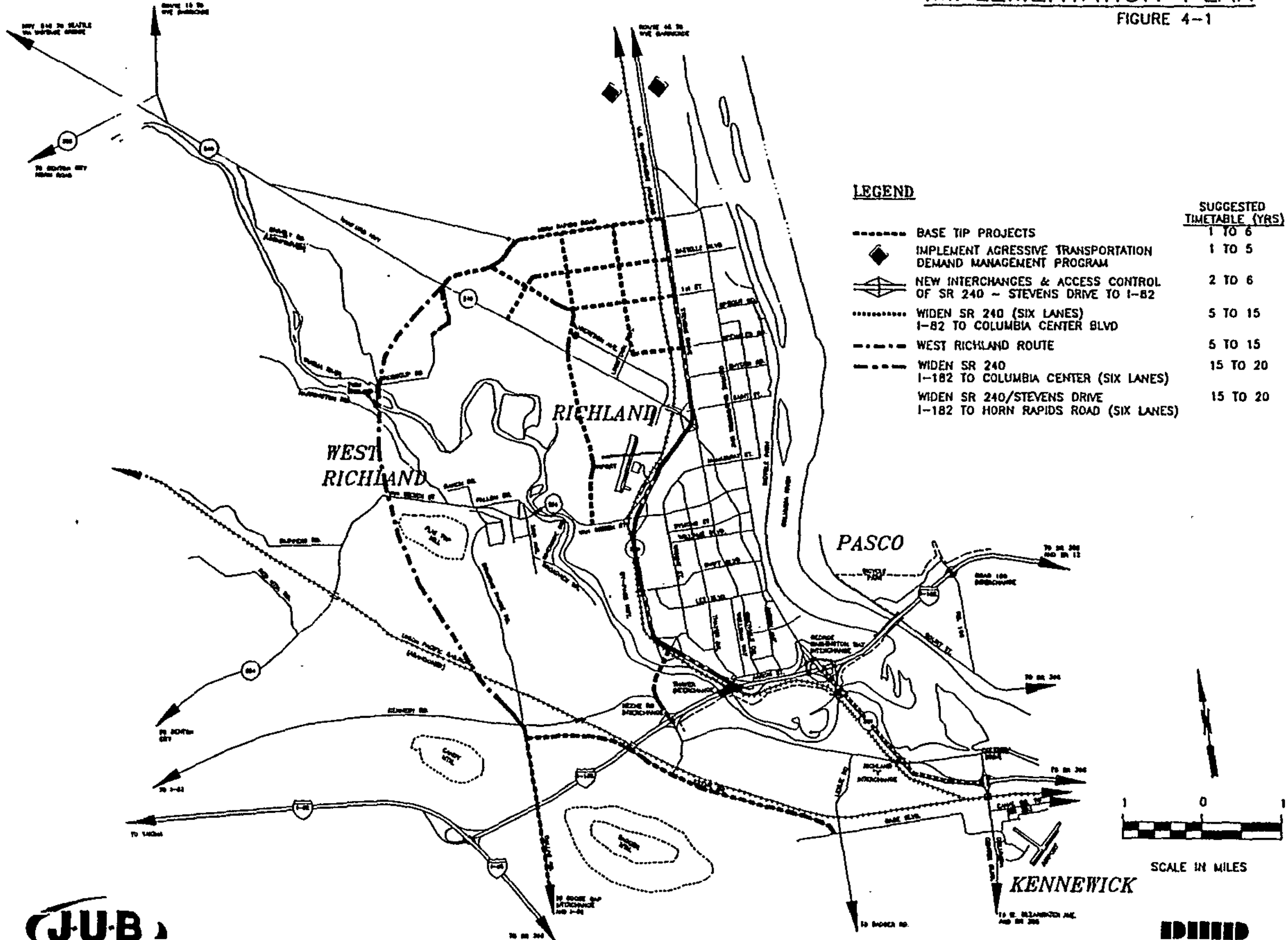
These recommendations and their respective suggested time tables are identified in Table 4-2 and Figure 4-1.

TABLE 4-2
RECOMMENDATIONS

Project	Suggested Time Table (years)
Implementation of Aggressive Transportation Demand Management Program	1 to 5
New Interchanges, Access Controls to Develop Freeway Facility	2 to 10
West Richland Route	5 to 15
Widen SR 240; I-182 to Columbia Center Boulevard (six lanes)	15 to 20
Widen SR 240/Stevens Drive; I-182 to Horn Rapids (six lanes)	15 to 20

IMPLEMENTATION PLAN

FIGURE 4-1



J-U-B

SR 240 METROPOLITAN TRANSPORTATION STUDY

BWR

APPENDIX A

APPENDIX A
SR 240 MODEL DEVELOPMENT

NETWORK DEVELOPMENT

There are two basic approaches to developing a sub-area transportation model: windowing and focusing. With windowing, a separate, smaller and more detailed model is developed. Major connections to the region are simulated by creating external stations. Focusing involves modifying the larger model by adding more detail to a specific area.

The focussing approach was chosen for development of the SR 240 model. This approach was selected due to the availability of the Tri-Cities model, because the SR 240 Study area comprises about half of the Tri-Cities model and because of the regional travel characteristics of Hanford employees.

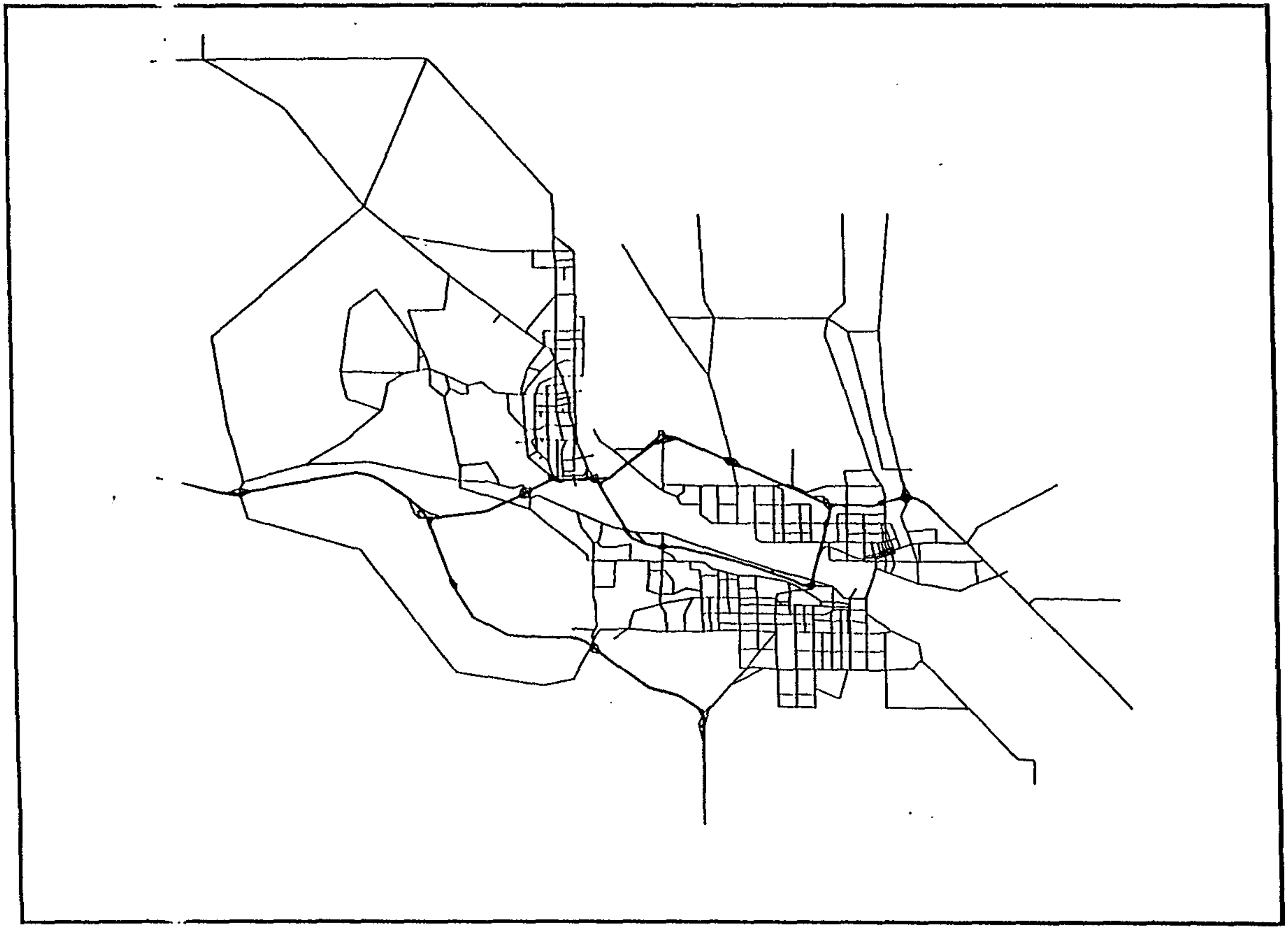
BFRC provided the base network which was calibrated by the Consultant. Because the network at that time had not been finalized, the Consultant checked it and made modifications to any coding errors. The model was then calibrated with traffic counts provided by BFRC. More detail in the Richland area was provided by dividing four zones in Richland into nine smaller zones. This enabled a more detailed evaluation of the SR 240 corridor in Richland. The Tri-Cities/SR 240 model is shown in Figure A-1.

Network inputs are described below:

Tables A-1 and A-2 list the numeric codes used to describe each of the data attributes.

NETWORK ZONE SYSTEM, EXISTING NETWORK

FIGURE A-1



Link Classification

Table A-1 summarizes the link classifications and capacity per lane values used for the Tri-city model. The classifications were assumed, based upon typical street capacities and previous modeling experience. Classifications include freeways, ramps, major arterials, minor arterials, collectors, and a hypothetical representation of local streets called centroid (or zone) connectors. This link can represent a combination of a number of local streets, and as such has a higher link capacity.

TABLE A-1
LINK CLASSIFICATION

Class	Facility Type	Capacity Per Lane
1	Freeway	1,750 vph
2	Ramps	1,200 vph
3	Major Arterial	1,000 vph
4	Minor Arterial	800 vph
5	Collector	500 vph
6	Centroid Connector	5,000 vph

Link Area and Type Designations

No Area or Type attributes were used in the link files.

One-or-Two-Way Direction

All links were checked for one-or-two-way entry. A one-way link is entered by entering a "1" in the one- or two-way column. All two-way links receive a "2".

Number of Lanes

This attribute is used to assign capacities to network links. It is also used for display and in some network calculator functions. All model links in the analysis area were checked for accuracy with this designation.

Capacity

Capacity is entered in terms of vehicles per hour (vph) for each link, directionally. The link capacity classification system used is also shown in Table A-1.

Length

The link lengths were automatically calculated by the software program using a coordinate system.

Design Speed

Link speeds were entered in miles per hour. Speeds used were primarily those initially coded by BFRC in the Tri-Cities model. They were closely tied to how travel times are calculated during simulation runs. Generally, posted speed limits are entered into the program during the data entry phase. However, posted limits do not always accurately depict free-flow conditions on the roadway, especially major roads that have speed limits that are often ignored. Some speeds were modified during the calibration process.

Intersection Node Data

Data needs for node files include the following:

- Classification (user-specifiable);
- Type (user-specifiable);
- Special Delay Links (SDLs);
- Area (user-specifiable);
- Capacity; and
- Base Delay.

Node Classification

Node classifications were determined based upon the functional classification of roadway approaches. The node classifications are listed in Table A-2.

TABLE A-2
NODE CAPACITY

Node Type	Node Classification Description	Node Capacity Equation (vph) $C=K_1 + K_4 *$ Entering Capacity)
9	Node In-Link (Shape Nodes)	32,000
11	Freeway Ramp Terminals - Merges	1.00
12	Freeway Ramp - Diverge	32,000
21	Ramp Intersections	0.45
33	State Arterial/State Arterial	0.45
34	State Arterial/Major Arterial	0.50
35	State Arterial/Minor Arterial	0.55
36	State Arterial/Colector Street	0.60
37	State Arterial/Local Street	0.65
38	State Arterial/Zone Connector	0.80
44	Major Arterial/Major Arterial	0.45
45	Major Arterial/Minor Arterial	0.50
46	Major Arterial/Collector Street	0.55
47	Major Arterial/Local Street	0.50
48	Major Arterial/Zone Connector	0.80
55	Minor Arterial/Minor Arterial	0.45
56	Minor Arterial/Collector Street	0.50
57	Minor Arterial/Local Street	0.55
58	Minor Arterial/Zone Connector	0.80
68	Collector Street/Collector Street	0.45
67	Collector Street/Local Street	0.50
68	Major Collector/Zone Connector	0.80
77	Local Street/Local Street	0.50

TABLE A-2
NODE CAPACITY

Node Type	Node Classification Description	Node Capacity Equation (vph) $C=K_1 + K_4 *$ Entering Capacity)	
78	Local Street/Zone Connector		0.80
8	Zone Centroid	32,000	
80	Zone Centroid on Intersection/Same Classes		0.45
81	Zone Centroid on Intersection/1 Class Difference	2,000	0.50
82	Zone Centroid on Intersection/2 Class Difference	2,000	0.55
83	Zone Centroid on Intersection/3 Class Difference	2,000	0.80
84	Zone Centroid on Intersection/4 Class Difference	2,000	0.65
85	Zone Centroid on Intersection/5 Class Difference	2,000	0.70
99	External Zone	32,000	

Node Area

No specific area designations were used for nodes in this model.

Node Type

No specific node types were assigned.

Node Capacity

Capacities at all nodes are required in the model. The program has the ability to model delay at intersections. If capacities are not used, delays cannot be calculated. This feature has been incorporated into the Tri-City Model to assign appropriate delays at these critical points on the network.

Node capacity was calculated by applying a factor times the entering link capacity. These factors are listed in Table A-2. The equation used to calculate is as follows:

$$\text{Capacity} = K_1 + K_4 \text{ (Entering Capacity)}$$

where: K_1 is a constant and K_4 is a factor

Special Delay Links (SDLs)

A unique feature in TMODEL2 is the ability to model intersections under stop or yield control. SDLs can be used at a node to denote which link(s) are under two- or three-way stop or yield control. If an intersection is a four-way stop, then no SDLs are entered.

As traffic is loaded onto the network, the program calculates Volume-to-Capacity (V/C) ratios at each node. Intersection delay is calculated using the V/C ratio. If SDLs are specified at the nodes, then any delay calculated during the simulation run is assigned to the special delay link(s) approaching the node to simulate a stop or yield. With a four-way stop, delay is experienced on all four legs and no SDLs are entered.

Base Delay

Additional delay can be added to an intersection if a known condition exists. This could be an all red condition at a signal, pedestrian phases, or a node representing a railroad crossing.

Turn Penalty Files

At some locations on a network it may not be possible to execute a certain turn movement. A supplementary file, the Turn Penalty File (.TNP), is available to simulate these conditions.

LAND USE CHARACTERISTICS

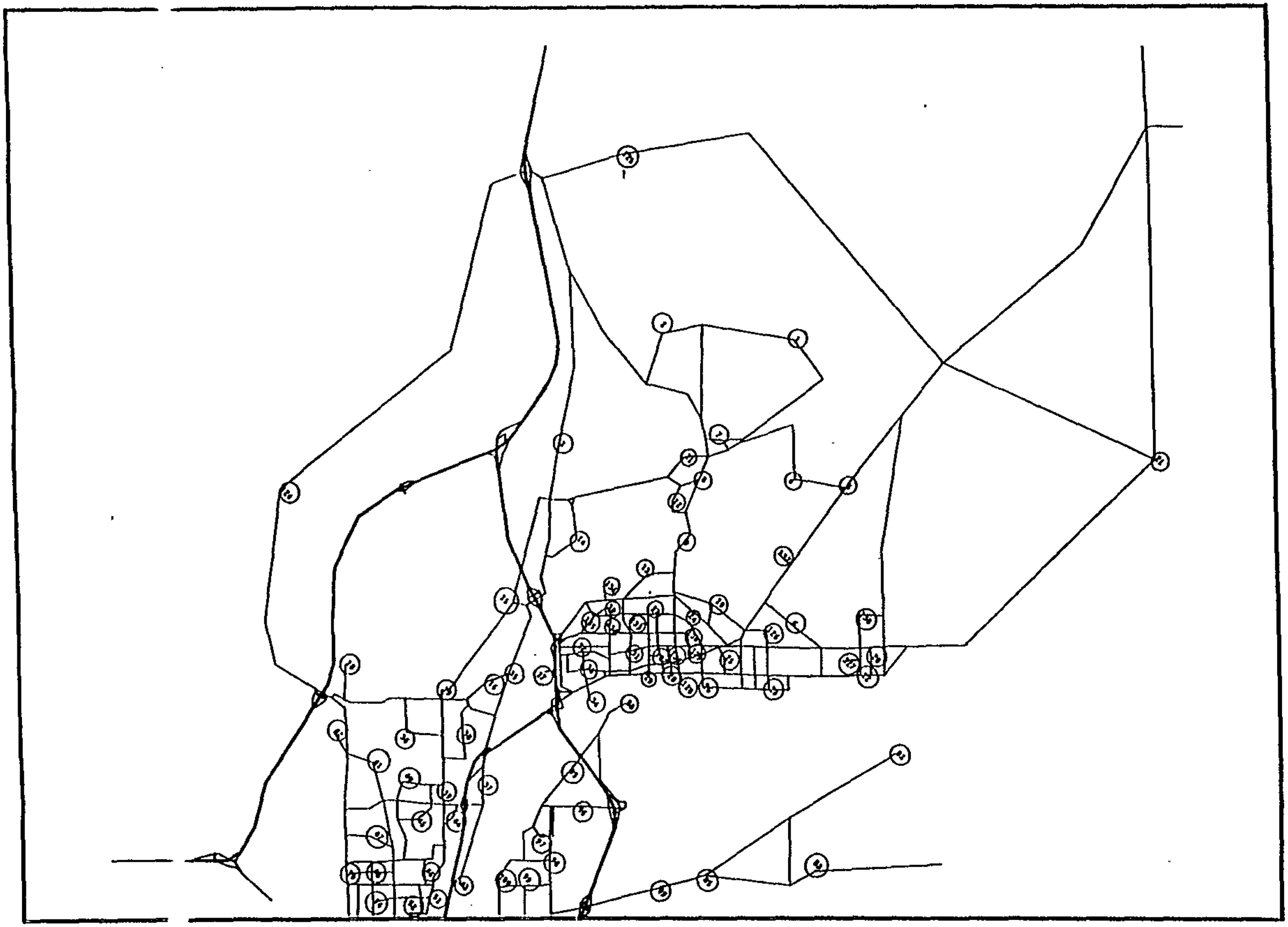
The base Tri-Cities model includes a study area with 138 traffic analysis zones (TAZs). The zone boundaries were determined by land use, physical boundaries (ridges, rivers, railroads and roadways), census boundaries. The BFRC, using its GIS system, inventoried the land use within each traffic zone. The land use data was separated into 14 categories (2 residential and 12 non-residential). Table A-3 shows the land use categories. The Tri-City Zone System is shown in Figure A-2.

TABLE A-3
LAND USE CATEGORIES

Residential	Non-residential (Retail)	Other Non-Residential
Single-Family (Dwelling Unit)	Wholesale/Retail (Employees)	Industrial/Manufacturing (Employees)
Multi-Family (Dwelling Unit)	Neighborhood Retail (1000 Square Feet)	Medical/Office (1000 Square Feet)
	Community Retail (1000 Square Feet)	Service/Office/Public Use (Employees)
	Regional Mall (1000 Square Ft)	Airport (Employees)
		College (Employees)
		Hanford Outer Area (Employees)
		Hanford Office (Square Feet)
		Hanford Office (Employees)

NETWORK ZONE SYSTEM

FIGURE A-2



SR 240 METROPOLITAN TRANSPORTATION STUDY

Zones interface with the transportation model at zone centroids. Zone centroids are the place where trips begin and end. Each zone has one zone centroid. In TMODEL2, these centroids may also be nodes on the roadway network. The Tri-City Transportation Model consists of two types of zones: internal and external. Internal zones are those zones central to the Tri-City area that contain described land uses. External zones are placed along majors roadways entering and leaving the Tri-city model area. There are 138 internal zones. Each of them have a corresponding zone centroid. The external zones are numbered from 141 to 151. These zones represent entry/exit points in the Tri-City Model.

Land Use Categories

Land use was obtained from BFRC, in cooperation with steering committee member jurisdictions. Land use data was summarized in these categories:

LU1 Single Family Residential includes land occupied by either a single family home or a manufactured home on single lot. The land use was measured in dwelling units.

LU2 Duplex uses are lots which contain two residences on a single parcel of land. Multi-Family Residential uses contain three or more residential units on a parcel of land. Also, this category includes mobile home parks, apartment buildings, and some condominiums. The land use was measured in dwelling units.

LU3 Industrial and Manufacturing uses included a broad range of general or specialty contractors: the production of food, textile, wood, furniture, paper, printing, metal, machinery, electrical and other products; and also includes transportation, communication and public utilities, such as railroads, trucking and warehouse, air transportation, pipelines, communication towers and electrical, gas and sanitary services. The land use was measured in employees.

LU4 Wholesale Trade facilities include the storage of durable or non-durable goods. Retail Trade includes those uses identified in SIC categories: 52-59 and motels and hotels (SIC 70). Retail uses include a broad range of establishments which sell goods directly to the general public, such as restaurants, automotive dealers, home furnishings, food stores or other products. The land use was measured in employees.

LU5 Services, Offices includes services and offices include banks or other financial institutions, real estate and insurance offices, personal services, such as laundry or cleaning services, business services such as advertising, automotive repairs, amusements, schools, churches, health care, legal services. Public Use are those land uses which are owned, or operated by units of government and provide the administration of public programs, which are identified in SIC codes of 91-97. The land use was measured in employees.

LU6 Neighborhood Retail trade in smaller buildings of 50,000 square feet or smaller. These tend to be smaller shops, quick-stop businesses, restaurants and gasoline stations.

LU7 Community Retail are larger retail buildings. Often these are mid-size shopping centers. Much of the retail in downtown Richland falls into this category.

LU8 Medical/Office. Medical or office buildings in which no employee information was available. Square feet was used as a replacement.

LU9 Hanford employment in the outer area in number of employees.

LU10 Regional Mall. Larger retail, such as Columbia center.

LU11 Airport. Includes the three Tri-Cities airports.

LU12 College. Columbia Basin College, Washington State and other higher education institutions.

LU13 Hanford Office employment in inner area in number of employees.

LU14 Hanford Office in inner area in square feet.

Trip Generation

After the land use data was attributed to the model's zonal system, the number of trips generated by each zone was calculated. This procedure, called trip generation, is a compilation of several mathematical formulas that determine the number of trips produced and attached to each model zone.

The Transportation Research Board (TRB), in NCHRP Report 187, describes a methodology for trip generation that includes the following trip purposes:

- Home-Based Work (HBW) trips,
- Home-Based Non-work (HBNW) trips, and
- Non-Home-Based (NHB) trips.

The base trip generation rates were taken from ITE's *Trip Generation Report*. Factors used to separate the trips into the three purposes and origins-destinations were from consultant experience, NCHRP Report 187, *Quick Response Urban Travel Estimation Techniques and Transferable Parameters*, and by the TModel Corporation in other studies. Adjustments were made to the rates during the calibration stage to account for local differences. P.M. peak trip hour generation rates for the calibrated model are listed in Table A-4.

TABLE A-4
TRIP GENERATION RATES

Land Use	Home-Based Work		Home-Based Other		Non-Home Based	
	Origin	Dest	Origin	Dest	Origin	Dest
LU1: SFDU.	0.040	0.250	0.100	0.270	0.030	0.030
LU2: MFDU.	0.019	0.192	0.086	0.163	0.019	0.019
LU3: Indus./Mfg.	0.200	0.009	0.0618	0.0103	0.041	0.0412
LU4: Whsle./Retail	0.216	0.027	0.5665	0.2266	0.6489	0.6489
LU5: Service/Public	0.225	0.018	0.1442	0.0721	0.0800	0.0800
LU6: Neighbor. Retail	0.325	0.049	1.030	0.4120	1.1630	1.1630
LU7: Community Retail	0.288	0.036	0.638	0.545	0.9680	0.9680
LU8: Medical/Office	0.476	0.118	0.363	0.172	0.144	0.144
LU9: Hanford Site	0.200	0.010	0.030	0.0008	0.0500	0.0030
LU10: Regional Mall	0.153	0.018	0.309	0.370	0.463	0.643
LU11: Airport	0.216	0.100	0.250	0.180	0.120	0.160
LU12: College	0.010	0.010	0.032	0.032	0.015	0.042
LU13: Hanford Ofc. Emp.	0.230	0.010	0.050	0.004	0.070	0.005
LU14: Hanford Office	0.0006	0.00001	0.0001	0.00005	0.0002	0.00004

* Example of formula

100 SFDU = 100 x .04 = 4 home-based work origins
100 x .25 = 25 home-based work attractions

100 sq. ft. retail = 100 x 1.030 = 103 home-based other origins
100 x 0.4129 = 41.29 home-based other attractions

Many urban areas have undertaken extensive origin-destination surveys. The data often is analyzed using regression or cross-classification techniques which are sensitive to household income or auto ownerships. This is rarely done for peak hour models. Typically, a trip generation rate is provided for each trip type (home-based work, home-based other, non-home-based) or for each type of use (households, employment type). It is important that the model generate different trip productions and attractions for different trip purposes so that different travel characteristics can be accounted for in the gravity model distribution.

Trip Distribution and Assignment

Trip distribution is the process of allocating trips between various zones of the network. The product of the distribution is a trip table that contains the number of trips between all zonal pairs. The process of distributing trips was accomplished using a gravity model formulation. The gravity model is based upon an analogy of Newton's Law of Universal Gravitation where trip pull is proportional to the size of an attraction, and inversely proportional to the distance away from the attraction.

The form of the gravity model is adapted to each study area by changes to exponents in the equation which influence the distance function of the gravity model. The gravity model parameters used in the Tri-City Model are listed in Table A-5.

TABLE A-5
GRAVITY MODE EXPONENTS

Trip Purpose	Beta Constant	Alpha Exponent	Constant
Home-Based Work	1.2	-3.0	100
Home Based Other	2.2	-2.5	200
Non-Home Based	2.5	-2.5	100

To obtain simulated volumes, traffic was assigned to the network using the distributed trips. Traffic was assigned to the shortest paths between zones based primarily on travel time. An incremental assignment approach was used where the trips were allocated in increments of .4, .3, .2 and .1.

NETWORK CALIBRATION

Calibration is defined as the process used to adjust a model to replicate actually measured travel patterns and traffic volumes on the network. Calibration is completed through a series of model simulation runs. Land use, trip generation rates, the gravity model exponents and the computer network are reviewed following each simulation run.

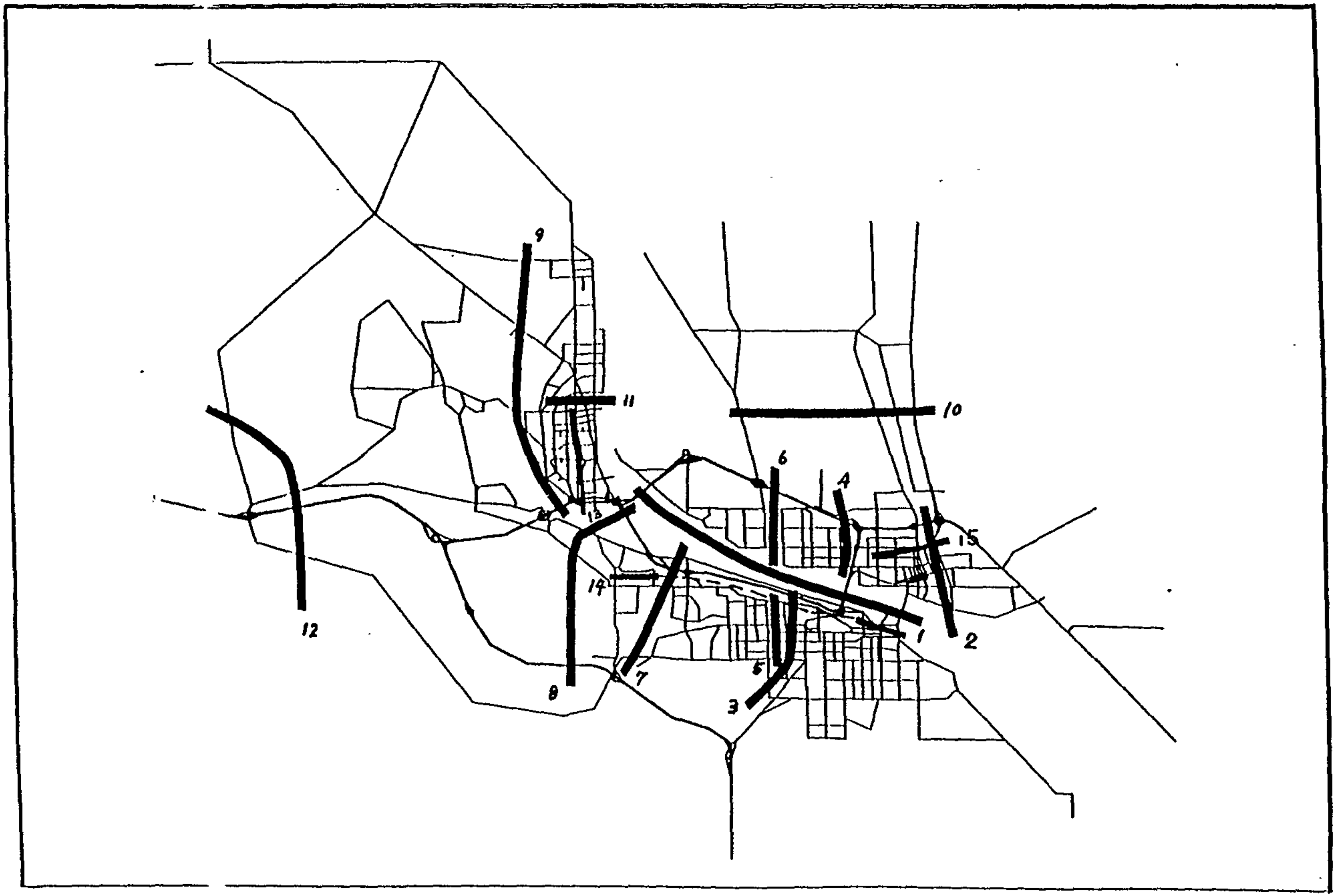
Key to calibration is an assessment of acceptable error and a determination of traffic count accuracy. Past experience by the consultant, the TModel Corporation, and FHWA has determined a relationship between acceptable error and the amount of traffic volumes counted on a given link.

To calibrate, screenlines were defined across the network. For Tri-City, fifteen screen lines were defined and are shown in Figure A-3. Screenlines for the model crossed 71 links, and traffic counts were collected or estimated from ADT counts for each link.

Using the TMODEL2 software, screenline assigned volumes from the run were compared against the known screenline count data. A report was printed listing the error from that run and the acceptable level of "error" outlined in National Cooperative Highway Research Program Report #255, *Highway Traffic Data for Urbanized Area Project Planning and Design*. The report presents a methodology that formulates the "maximum acceptable level of error" for roadways based upon their existing volumes. The methodology is based upon the assumption that the maximum traffic assignment deviation should not result in a design deviation of more than one highway travel lane. The screenlines analysis summary for Tri-City is listed in Table A-6.

NETWORK SCREEN LINES

FIGURE A-3



JUB

SR 240 METROPOLITAN TRANSPORTATION STUDY

BRR

TABLE A-6
SCREENLINE ANALYSIS

Screenline	From-To		To-From		Total		Percent	Allow
	Volume	Count	Volume	Count	Volume	Count	Difference	Deviation
1	4,662	4,311	3,761	3,324	8,423	7,635	9	58
2	1,419	1,281	1,614	1,654	3,033	2,935	3	64
3	5,026	4,390	3,549	3,811	8,575	8,201	4	57
4	2,605	2,688	2,343	2,130	4,948	4,818	3	61
5	2,202	2,425	1,899	2,027	4,101	4,452	-9	62
6	1,509	1,294	871	857	2,380	2,151	10	65
7	4,031	3,471	2,147	1,863	6,178	5,334	14	61
8	3,992	4,036	1,653	1,716	5,645	5,752	-2	60
9	1,032	1,243	1,990	1,968	3,022	3,211	-6	64
10	677	711	590	753	1,267	1,464	-15	66
11	1,736	1,530	4,719	5,001	6,455	6,531	-1	59
12	549	551	637	709	1,186	1,260	-6	66
13	1,251	1,503	2,526	2,214	3,777	3,717	2	63
14	3,164	3,127	4,474	3,968	7,638	7,095	8	58
15	905	122	1,171	1,495	2,076	2,617	-21	64
Total	34,760	32,683	33,944	33,490	68,704	67,173	2	

Total Percent Difference calculated using only those for which Ground Cont >0.
Allow Deviation (Maximum allowable deviation) from Figure A-9 of NCHRP 255.

APPENDIX B

APPENDIX B
DESCRIPTION OF TDM STRATEGIES

Ridesharing

Ridesharing includes carpooling and vanpooling. Programs to encourage ridesharing include ride matching (matching riders and drivers); providing a fleet of vans for vanpools; preferential parking for carpools and vanpools; distribution or posting of information about ridesharing; and fleetpool programs which allow employees to use the employer's fleet during non-work periods for employee-operated carpool programs. As an incentive to rideshare (or use transit), the employer may subsidize partially or fully the out-of-pocket costs of an employee work trip. Subsidy options can include transit passes, carpool parking fees, vanpool fares, and guaranteed rides home in an emergency or after normal work hours. Ride home guarantees can also be provided as a service by a public or non-profit agency.

Transit

Bus transit is an essential public service which supports and fosters densely developed areas, especially City Centers. Factors affecting its use include per capita incomes, car ownership, intensities and patterns of land use, employment levels, employment concentrations, and accessibility. Incentives to encourage additional bus transit usage include park 'n' ride lots, travel time reductions, and more direct routing of buses. As with ridesharing, employer subsidy of bus passes can provide the incentive to use transit as the work-related trip mode.

Parking Management

Parking management includes parking subsidy removal (employer provided parking), parking pricing, and parking restrictions. The removal of employer-based parking subsidies at employment sites where parking charges currently exist (in larger downtowns) or the instituting of employee-paid parking charges at employment sites where parking charges do not currently exist (typically in suburban areas) is effective in converting drive-along commuters to carpools or transit. Parking supply limitations through development controls and curb parking restrictions also encourages the use of carpools or transit by making driving alone more difficult. Limiting the parking supply will also result in a parking cost. Limiting parking supply could include putting a "cap" on the number of parking spaces in an area of the community (such as a downtown). A limit on parking supply could also occur as the result of zoning restrictions or high costs (land acquisition, etc.)

Telecommuting

Telecommuting refers to the use of telecommunications technology (computers connected through modems, facsimiles, telephones) for certain employees to work from a remote site or their home. Telecommuting can be an effective TDM strategy by shortening or eliminating commute trips to primary office sites. However, telecommuting from a remote site will add traffic to the road system near the remote site.

Work Schedule Changes

Work schedule changes include flex-time and staggered work hours, and compressed (four-day) work weeks. These schedule changes remove trips from the most congested peak hours. In addition, flex-time promotes use of transit or ridesharing by allowing employees to match their work schedules to available services.

Vehicle Use Restrictions

Vehicle use restrictions include the development of auto-restricted zones, pedestrian malls, and residential traffic control strategies to discourage non-resident use of residential streets. The measures discourage auto use and encourage pedestrian use.

Road Pricing

This strategy includes a range of pricing alternatives which might be applied to congested bridges, freeways, or arterial streets. Pricing strategies include tolls for low-occupancy vehicles or for peak hour traffic. Reduced transit fares is another way of making transit more competitive with the automobile from a price perspective.

Special Events Measure

Special events measures are transportation demand management programs designed to specifically reduce traffic on roads and streets adjacent to special events. Strategies include off-site parking with shuttle vehicles, neighborhood parking control programs, and on-site parking price increases.

High Occupancy Vehicle Facilities

High occupancy vehicle facilities include HOV or diamond lanes on freeways and arterials, queue jump lanes at intersections or bridges, and preferential parking.

Employer Based Transportation Management Programs

Employers play a critical role in transportation management. Washington State has a Trip Reduction Ordinance in effect that applies to companies that have more than 100 employees. These companies must institute programs (employer sponsored shuttles, vanpools, employer subsidized bus pass programs, etc.) to reduce the number of single occupancy vehicle trips that these firms generate. In order to reduce peak period vehicle trips, the most logical place to affect behavior and group trips is at the work site. A number of employer programs have been in existence for a relatively long time. These programs have been encouraged by manage factors including public marketing programs. More recently, there has been a movement to establish specialized, nonprofit organizations to facilitate private involvement in resolving transportation problems. These organizations are most commonly referred to as transportation management associations (TMAs). As with business organizations, TMAs provide a forum to discuss and reach consensus of transportation needs. Most TMAs, however, also promote and operate commuter programs such as ridesharing.

Land Use Strategies to Reduce Trips or Trip Lengths

The number and arrangement of home and businesses on land determines the number and length of trips and can determine whether the trip is made by automobile, transit, bicycle, or walking. Land use strategies to reduce trips or trip length include: employment concentration into mixed use centers, employment/housing balance, and neo-traditional neighborhood street design.

Concentrating employment in mixed-use centers (similar to a traditional downtown) makes transit and ridesharing more attractive because walking can be used for some mid-day trips (such as restaurants or retail stores). Providing an adequate supply of affordable housing near employment centers shortens trips, thereby reducing miles of automobile traffic. Bicycling and walking are also more attractive.

Neo-traditional neighborhood design addresses transportation by emphasizing pedestrian and bicycle-friendly design with regularly spaced street network patterns or grids. Neo-traditional neighborhoods are designed to give people choices about how they commute to work, errands and school, as well as to provide for social interaction. A neo-traditional neighborhood has superior traffic capacity, but lower speeds due to the larger number of intersections. A dense network of streets reduces the travel distance, possible by as much as 25%. Streets are designed for bikes and pedestrians as well as cars.

APPENDIX C

APPENDIX C
PUBLIC CORRESPONDENCE

In addition to comments recorded by the public during public meetings, the following pages contain copies of correspondence received throughout the course of the study.

From TCBC: Tri Cities

Proposal for SR240 Route Plan

1. Restripe Stevens between 240/Jadwin intersection and 300 area according to Design Manual "Facilities for Non-motorized Guidelines" Section 1020-22 (Figure 1020-10, (6/89)) for bike lanes and right turn lanes.

2. Build a Stevens Drive overpass or install signal at Spengler for pedestrians/bicycles. Striped pedestrian walkways through 1100 area. by bus lot/1163 and other buildings in the area west of Stevens.

3. Sign Stevens indicating right lane merge lane must merge left before next intersection and right turn lanes marked as right turn only. There are currently arrows painted on the pavement but no signs posted. Many drivers are ignoring the painted arrows.

4. Install bike lockers in Hanford area bus parking lot (with overpass/signal for bicycle access) or provide bike lockers and a bus stop on East side of Stevens for cyclists and pedestrians if no overpass/signal can be installed at Spengler.

5 Trippable signal at By-Pass/240 intersection for bikes.

6. Close section of road between Stevens/240 for both north and south bound traffic. Change routing to use Coast Street extension to By-Pass/Stevens. Very dangerous because of angle of cars entering/merging with By-Pass traffic travelling north. Intersection at By-Pass/240/Coast St. has a signal. Widen the Coast Street extension to four lanes with 2 lanes turning left for Stevens/By-Pass traffic travelling south. See attached drawing.

7. Stripe bike lanes on George Washington Way from McMurray north to 1st St. Sign bike route through 1100/3000 area north from 1st St. to Horn Rapids Road.

8. Ensure all road construction meets "AASHTO Guide for the Development of Bicycle Facilities" and "Facilities for Non-motorized 1020" guidelines. Especially in respect to bike lanes/right turn lanes. All new road/highway construction to include striped bike lanes.

9. Invite Mike Dornfeld, the Washington State Bicycle Pedestrian Coordinator, to hold a bicycle facilities-design seminar in the Tri-Cities.

10. Ask that the major contractors adopt the guidelines of the Commute Trip Reduction Act of Washington.

11. Ask the City Council of Richland and DOE Richland to adopt a goal of 10% commute trips by bicycle.

12. Build smaller parking lots and require installation of bicycle lockers at all employees' work locations where there are more than 25 employees.

Possible Keene Rd. improvements:

1. Post Keene Rd. between Kennedy and Gage Blvd. with "Bicycles on the Roadway" signs.

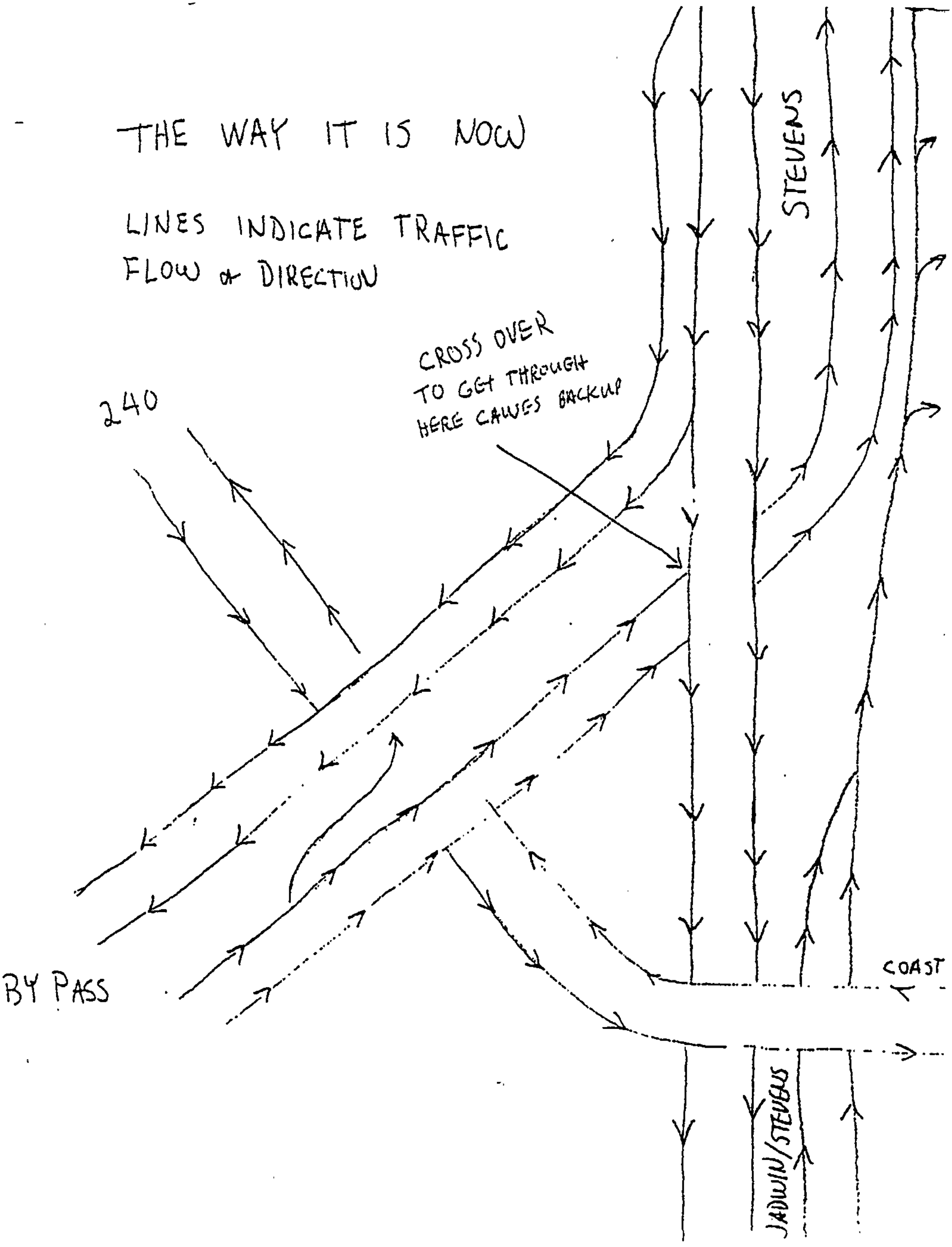
2. Stripe bike lanes on both sides of the road—minimum 3 ft. wide.

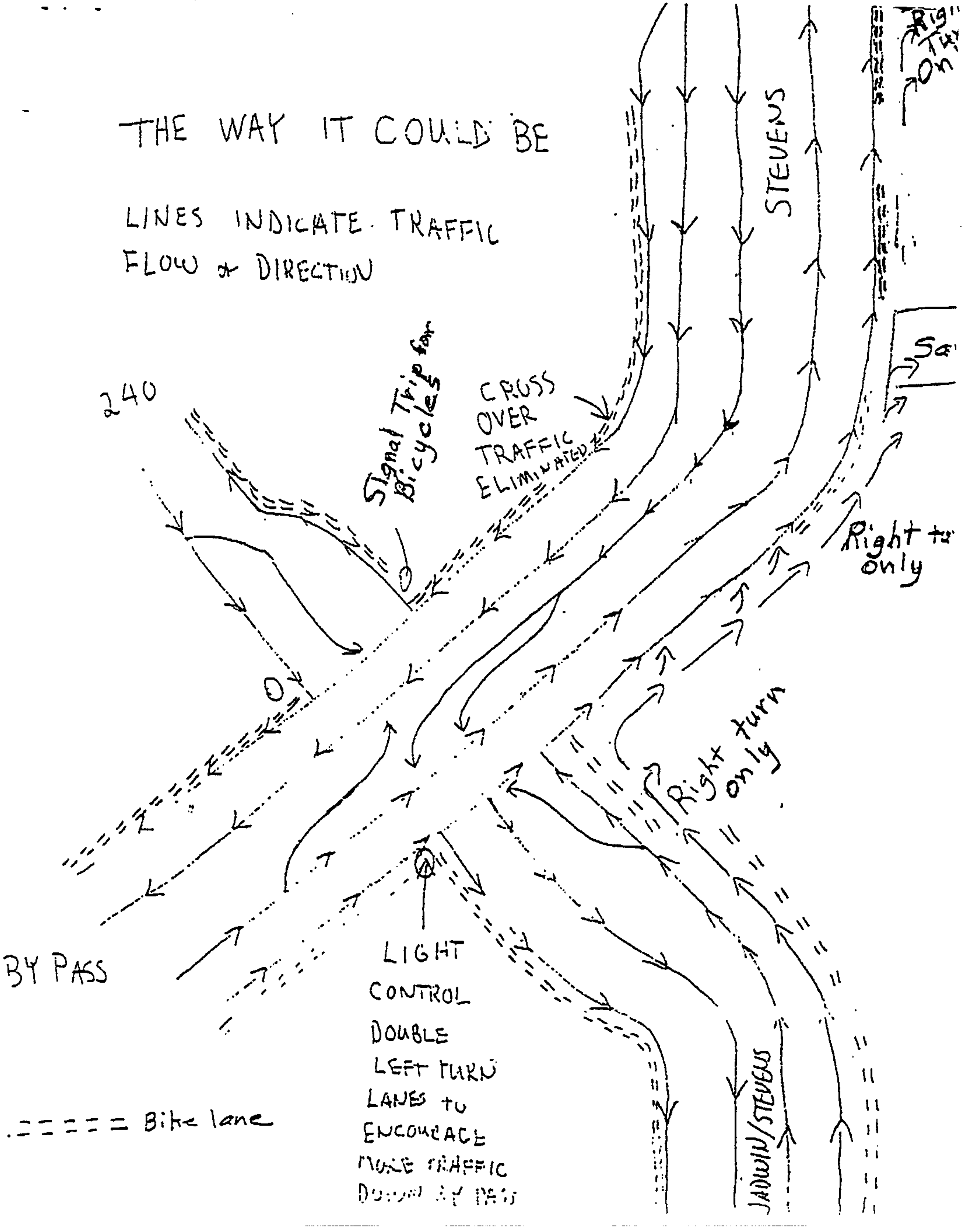
3. Widen Keene Rd. to 30 ft. lanes with 5 ft. shoulders and striped bike lanes.

Judy Packard 376-0453 W
Scott Clauss 376-9060 W

THE WAY IT IS NOW

LINES INDICATE TRAFFIC FLOW & DIRECTION




THE WAY IT COULD BE
LINES INDICATE TRAFFIC FLOW & DIRECTION
STEVENS
240
Signal Trip for Bicycles
CROSS OVER TRAFFIC ELIMINATED
Right turn only
Right turn only
BY PASS
LIGHT CONTROL DOUBLE LEFT TURN LANES TO ENCOURAGE MORE TRAFFIC DOWN BY PASS
JADWIN/STEVENS
===== Bike lane

BENTON-FRANKLIN GOVERNMENTAL CONFERENCE
P.O. BOX 217 • 1622 TERMINAL DRIVE • RICHLAND, WA 99352-0217
TELEPHONE (509) 943-9185 • FAX (509) 943-6756

KEN/MARK

CARL HALLER
2160 SHERIDAN PLACE
RICHLAND WA 99352

MR HALLER CALLED IN RESPONSE TO A REQUEST FOR COMMENTS FROM PEOPLE NOT ABLE TO MAKE THE PUBLIC MEETING ON SR240 STUDY. HIS BASIC COMMENTS ARE:

NOW THAT MOST OF THE RESTRICTIONS HAVE BEEN REMOVED ON ACCESS TO THE HANFORD AREA, why IS BFT NOT SERVING THE ENTIRE SITE. HE FEELS THAT THOSE PEOPLE LIVING IN PASCO AND KENNEWICK AS WELL AS MEADOW SPRINGS COULD MAKE USE OF BFT IF SERVICE WAS PROVIDED.

IF WE HAVE A MAILING LIST ATTACHED TO THIS STUDY, HE WOULD LIKE TO BE PLACED ON IT.

Done
Ken

GWEN
5/25

CITY OF WEST RICHLAND

3805 Van Giesen St. ❖ West Richland, WA 99352 ❖ Tele: (509) 967-3431 ❖ FAX (509) 967-2251

M E M O R A N D U M

DATE: July 29, 1993

TO: SR-240 Metropolitan Transportation Study Technical Advisory Committee

FROM: Paul Chasco, City Administrator City of West Richland

SUBJECT: SR-240 Metropolitan Transportation Study Public Meeting July 29, 1993

The City of West Richland understands the need to consider alternative transportation parallel routes to SR-240 between Hanford and Kennewick and West Richland generally supports the concept of a West Richland Circumferential Route, however; we have the following comment and/or concern regarding SR-240 Transportation Study:

1. On page 32 of the SR-240 Transportation Study, Section 2, a transportation solution to investigate is described as "constructing a new route to West Richland and continuing along Bombing Range Road to potentially divert traffic from the SR-240 corridor to this route."

   On page 40 SR-240 Transportation Study, Section 2, Scenario 5:, The West Richland Circumferential Route is described as including, "constructing a new arterial facility to extend from Horn Rapids Road to the Twin Bridges over the Yakima River and around Flat Top Hill to intersect with the Bombing Range Road alignment. The typical cross section for this roadway is a super-two type facility, including two through lanes, turn lanes, and acceleration and deceleration lanes, as appropriate."

   As you will note the two references for diverting traffic to West Richland are not the same proposal. We prefer Scenario 5 described on page 40 of said document and wish to have the difference clarified.

2. The population allocations described in Table 2-3 on page 37 of the subject document are utilizing old data. You may wish to review the annually updated population allocation with Phil Mees, GMA Planner, Benton County Planning Department.

   West Richland's 1993 population is 4,510 and the <u>new</u> 2012 forecasted population is 5955.

How accurate are the trip generation forecasts if the model is utilizing 1991 data? We prefer to have the most recent data used because the marginal differences may skew the ranking of the preferred solutions.

3. We have a concern that the West Richland "Bypass" will become a fact by default because of the following described improvements to the Benton County road system, all of which may not have been programmed into the computer model:

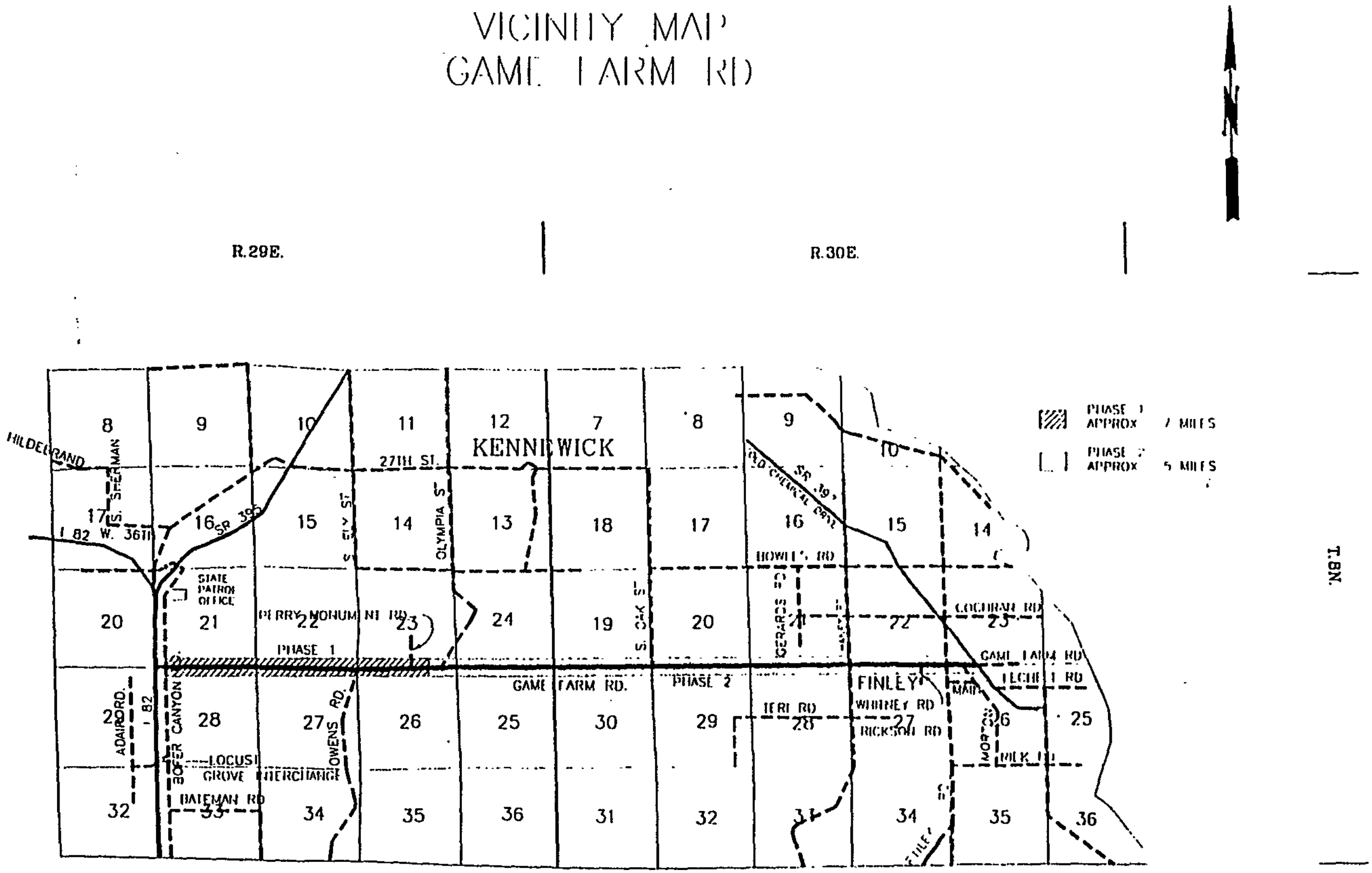
A. Twin Bridge Replacement. We realize the need for this facility, support the replacement and understand the route is considered in the study.

B. Dallas Road Improvement. This is a long over due improvement and we herald its completion and understand the route is considered in the study.

C. Game Farm Road Improvement, Phase 1. This an extension of the "Ring Road", easterly of the I-82/SR-395 interchange and connecting the interchange with the south end of Olympia Street. The Phase 2 improvement is proposed to extend east to Chemical Drive in Finley. **Phase 1 is funded for improvement.**

We ask if this route with its easterly connection to south Kennewick has been considered in the study? And, request that the described southerly route be modeled with the updated population data to forecast the anticipated traffic volumes.

VICINITY MAP
GAME FARM RD

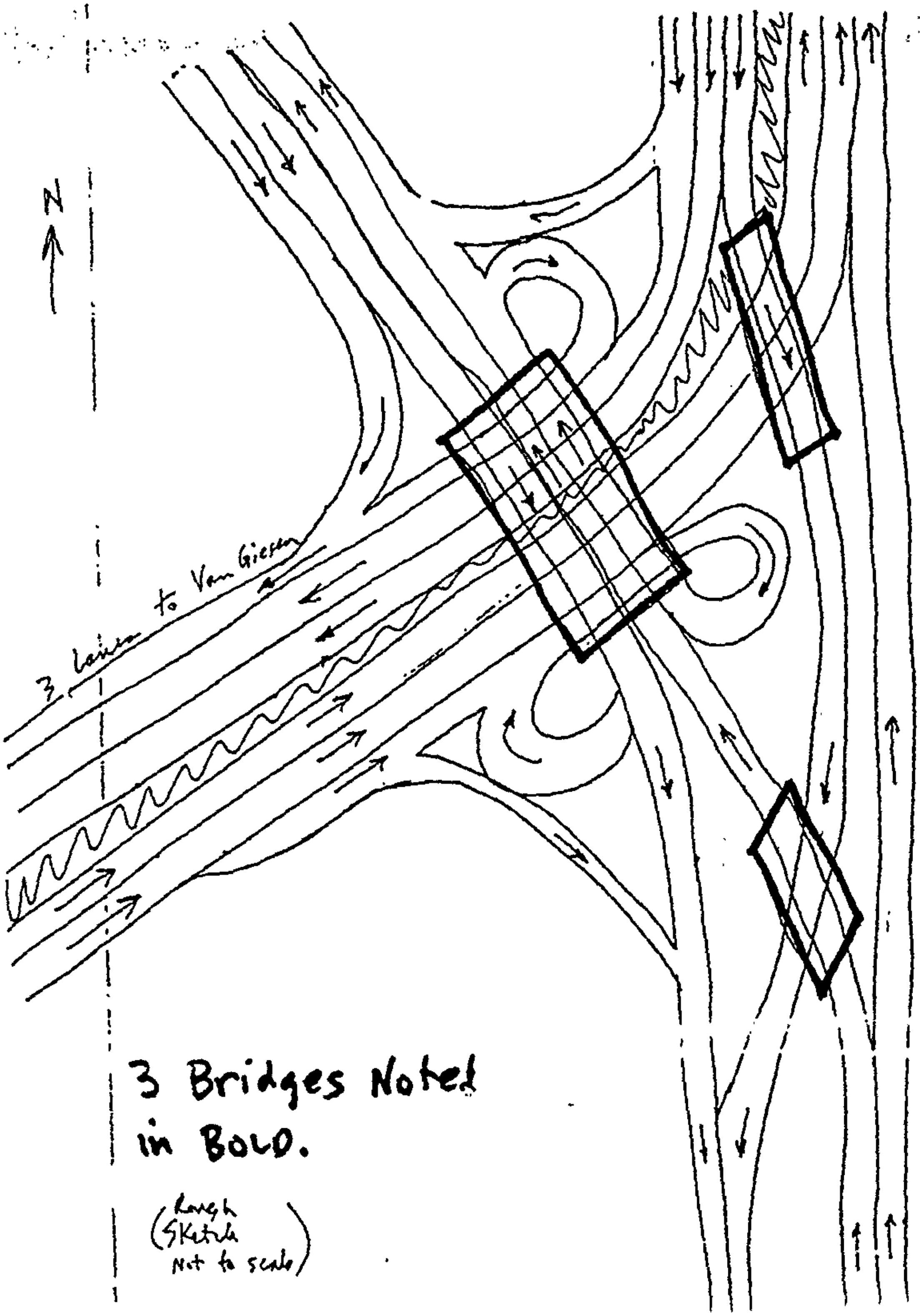


Fax Transmittal Memo 7672

To: Ken Alford		From: Howard Bragu	
Company		Company	
Location		Location	Dept. Charge
Fax # 943-6756	Telephone # 943-9185	Fax # 372-2445	Telephone # 376-3637
Comments		Original Disposition: ☐ Destroy ☐ Return ☐ Call for pickup	

No. of Pages 1 Today's Date 5/24/93 Time

Quick sketch of possible approach for intersection of SR 240 / By pass & Stevens.



3 Bridges Noted in BOLD.

(Rough Sketch Not to scale)

1824 Riverside Dr., Richland, Washington 99352-5262
509-967-3611
1 August 1993

RECEIVED
AUG 0 2 1993
B.F.G.C.

Ken Alford
Benton Franklin Regional Council
1622 Terminal Dr.
Richland, WA 99352

Dear Ken Alford:

To make the report on the Transportation Study of 29 July 1993 more useful, these are my reactions:

There should be, and there probably are, numerous scenarios for the Growth Plan of the Metropolitan Area at Lake Wallula. Future projections for Highway 240 need to be in the reality of this projection, probably with a population of 300,000 to 500,000.

The grade crossing on the By-Pass at Van Giesen had been planned, but was eliminated by the high price, I was told. This long range project with variations, would be useful to all government entities, and should be a common reference for all of them.

The attainment of this common goal would be by all entities working cooperatively and not left to separate government units to carry out.

A The long range choice would be the Metropolitan Plan for 300,000 to 500,000 population.

The Short-range Plan would be that portion of the plan feasable to do at the present time.

The shop price would not be the determining factor, rather the objective would be the attainment of the needs goal.

B The economic cost of a road is not the shop price. The cost of achieving a specified goal would include money already allocated and budgeted.

The price of not achieving a goal would also be included in the cost. For example, the cost of not building the Horn Rapids Road-Columbia River bridge is costly not only to agriculture, machinery shipping and the individual commuter, but especially in achieving economic growth balance in this area.

C Before inviting the public to respond to this Transportation Report there should be the Long-Range Metropolitan Plan with variants;

2. An Implementation Plan for the Metropolitan area working as a unit, not as fragmented entities'

3. Cost determined in terms of economic goal needs, including cost for not implementing that need, and not by shop price.

Very truly yours,

Faith Coate

cc:

Claude L. Oliver
Treasurer
BENTON COUNTY

Prosser Phone (509) 786-2255
Tri-Cities (509) 783-1310 Ext. 5662
Fax (509) 786-5628

P.O. Box 630
Prosser, Washington 99350-0630

RECEIVED
AUG 0 5 1993
B.F.G.C.

August 4, 1993

Mr. Mark Kushner
Benton Franklin Regional Council
Post Office Box 217
Richland, Washington 99352

Dear Mr. Kushner:

In response to your SR 240 Transportation Study for Benton Franklin Regional Council, I would offer in reviewing the funding sources as identified on page 70, that there seems to be a glaring deficiency with regards to funding source considerations.

As you are well aware the driving force for transportation impacts is the expanded population base due to the Hanford clean up activity. The primary employer involved in this process is the U.S. Department of Energy and its operating contractors. Due to its tax exempt status, the U.S. Department of Energy is a non taxpaying employer. However, the consequences of their employment must be paid for by someone.

I have enclosed a copy of August 3, 1993 correspondence to Ms. Betty Corbin of SRA Technologies, Alexandria, Virginia. In the text of the letter to Ms. Corbin, you will see we are requesting that various infrastructure impact studies be reviewed by SRA Technologies as to the impact for Hanford cleanup.

I would encourage you to include in funding sources under socioeconomic response considerations for the environmental impact statements now required by the U.S. Department of Energy. Transportation impacts should also be included and responded to in the normal public hearing process as identified for responsibilities from the U.S. Department of Energy. Our community will need to identify those infrastructure impacts as they affect this tax base and our ability to pay reasonably for those services. Service demands placed beyond our normal abilities should be viewed as socioeconomic mitigation, and therefore in context defined in some form by the U.S. Department of Energy for participation funding.

The history of U.S. Department of Energy payment for transportation impacts is quite well known at other communities. If our community is to have this issue appropriately identified and included for analytical consideration, it is imperative that you include funding options derived from U.S. Department of Energy socioeconomic and environmental impact mitigation in your study.

Sincerely,

Claude L. Oliver

CLAUDE L. OLIVER
Benton County Treasurer

CC: John Wagoner, Manager, Richland Operations
Board of Benton County Commissioners
Bobbie Gagner, Benton County Auditor
Barb Wagner, Benton County Assessor
Andy Miller, Benton County Prosecuting Attorney
Terry Marden, Director Benton County Planning
Joe King, Manager, City of Richland
Bob Kelly, Manager, City of Kennewick
Marge Chow, Superintendent Richland School District
Gary Fields, Superintendent Kennewick School District
Ray Tolcacher, Superintendent Prosser School District
Gary Henderson, Superintendent Kiona Benton School District
Donald Fekete, Superintendent Finley School District

Claude L. Oliver
Treasurer
BENTON COUNTY

P.O. Box 630
Prosser, Washington 99350-0630

Prosser Phone (509) 786-2255
Tri-Cities (509) 783-1310 Ext. 5662
Fax (509) 786-5628

RECEIVED
AUG 0 4 1993
B.F.G.C.

August 3, 1993

Ms. Betty Corbin
SRA Technologies
4700 King Street, Suite 300
Alexandria, VA 22302

Dear Ms. Corbin:

The Benton County Treasurer's Office is requesting information concerning the social economic study which SRA Technologies is performing for the U.S. Department of Energy. The question which arises regarding the RFP let to your firm by the Department of Energy is: "Are impacts to communities from U.S. DOE's presence being fully analyzed?"

Numerous concerns and financial burdens affect local communities when U.S. DOE sites are downsizing. However, Hanford which is located in Benton County, is presently in an upswing with clean-up which also causes extreme financial impacts in the local governments.

In Benton County, we currently have approximately $100,000,000 in school and taxing jurisdiction bond debt issues in various stages being presented to the voters in 1993/1994. In addition, road infrastructure and community impact costs due to Hanford clean up activity will readily approach $100,000,000. These bond issues, if passed, will be required to be repaid over a twenty year period. It is our understanding that employment at Hanford will peak within five years. The major problem is that when the downsizing occurs it leaves fewer taxpayers to carry a large burden of debt, resulting in a financial crisis for all levels of local governments.

On behalf of the Benton County taxing districts, we are requesting input into the social economic study in view of events which are now happening, and the results to local governments within the boom and bust cycles caused by the ramp up and ramp down of sites such as Hanford.

Ms. Betty Corbin
Page 2
August 3, 1993

We would be looking at submitting examples of the effects to local governments in trying to cope with law enforcement, roads, facilities etc. to maintain the level of services required by the Hanford clean up driven population base.

Hopefully in order to fully determine U.S. Department of Energy Community impacts, you are looking at all activity creating public conflicts and service costs. In follow up, my office will be calling to discuss your response.

Sincerely,

CLAUDE L. OLIVER
Benton County Treasurer

CC: Hazel O'Leary, Secretary of Energy, Department of Energy
The Honorable Patty Murray, U.S. Senator
The Honorable Slade Gorton, U.S. Senator
The Honorable Jay Inslee, U.S. Representative
John Wagoner, Manager Richland Operation
Board of Benton County Commissioners
Bobbie Gagner, Benton County Auditor
Barb Wagner, Benton County Assessor
Andy Miller, Benton County Prosecuting Attorney
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Gary Fields, Superintendent Kennewick School District
Ray Tolcacher, Superintendent Prosser School District
Gary Henderson, Superintendent Kiona Benton School District
Donald Fekete, Superintendent Finley School District
Benton Franklin Good Roads Association

RECEIVED
AUG 11 1993
B.F.G.C.

Bruce Higley
4700 Mallard Ct.
West Richland, WA 99352

Mr. Ken Alford
Benton-Franklin Regional Council
PO Box 217
Richland, WA 99352

Highway 240 study

I was unable to attend your hearing on July 29, 1993 but would like to provide my comments by letter. I hope they arrive in time for your consideration.

I and my wife commute to Hanford from West Richland via the Van Giesen-Bypass interchange. We favor the option to upgrade the Bypass highway with interchanges. I do not feel that expanding the roadway to six lanes will be of benefit. I believe the main obstacle to traffic flow are the traffic signals on the Bypass.

Currently, when traffic is heavy, you can routinely observe several types of hazardous driving at the Van Giesen intersection. In the morning, when traffic from West Richland is backed up to turn north on the Bypass, it is common for people who work at offices at the Richland airport to drive in the oncoming traffic lane to get to the airport road faster. In the evenings, cars traveling north on the Bypass and turning west on Van Giesen to West Richland will back up beyond the start of the turn lane into the fast lane (north bound middle lane of the Bypass). Traffic from Richland also backs up, causing drivers who want to go south on the Bypass to drive the oncoming traffic lane. Also in the evenings the southbound Bypass exit lane is too short and impatient drivers frequently drive on the shoulder. I know we should all drive defensively, but I think most of these driver caused hazards would be best solved by building interchanges.

Sincerely

Bruce A. Higley

Bruce A. Higley